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MOTORS AND SENSOR CONNECTED TO PROFIBUS

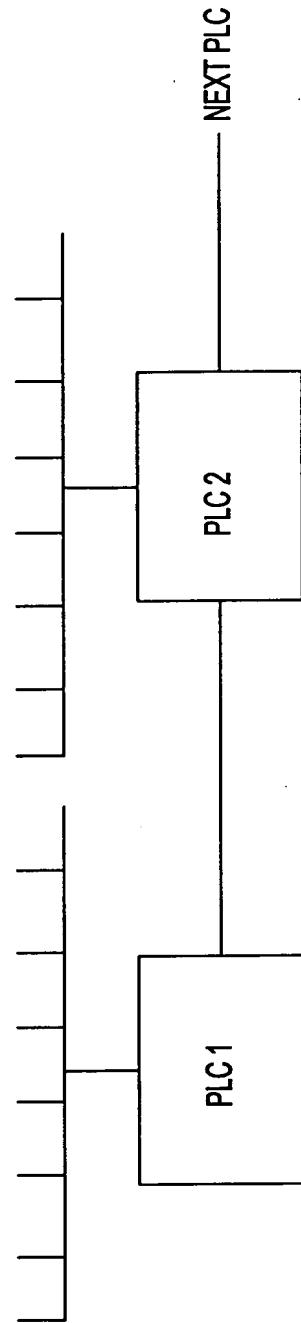


FIG. 1
(PRIOR ART)

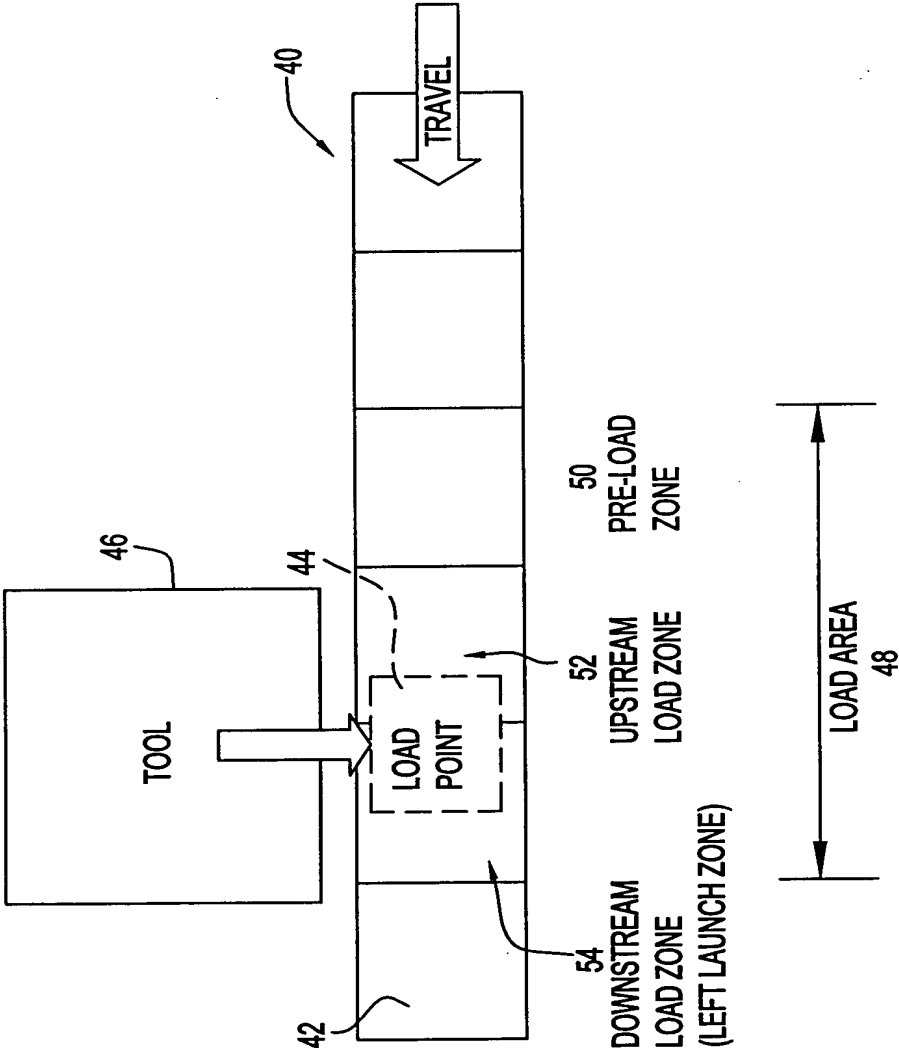


FIG. 2A

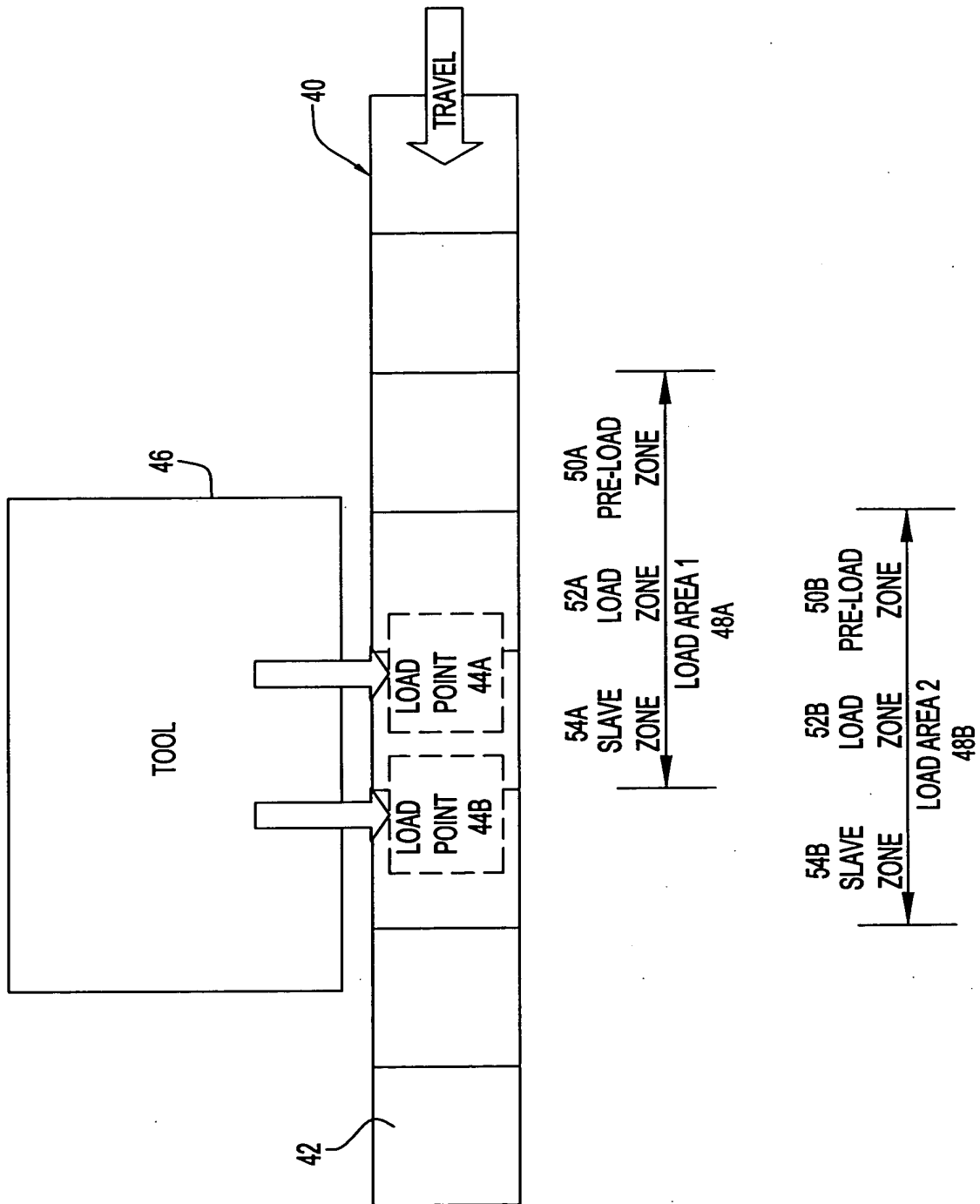


FIG. 2B

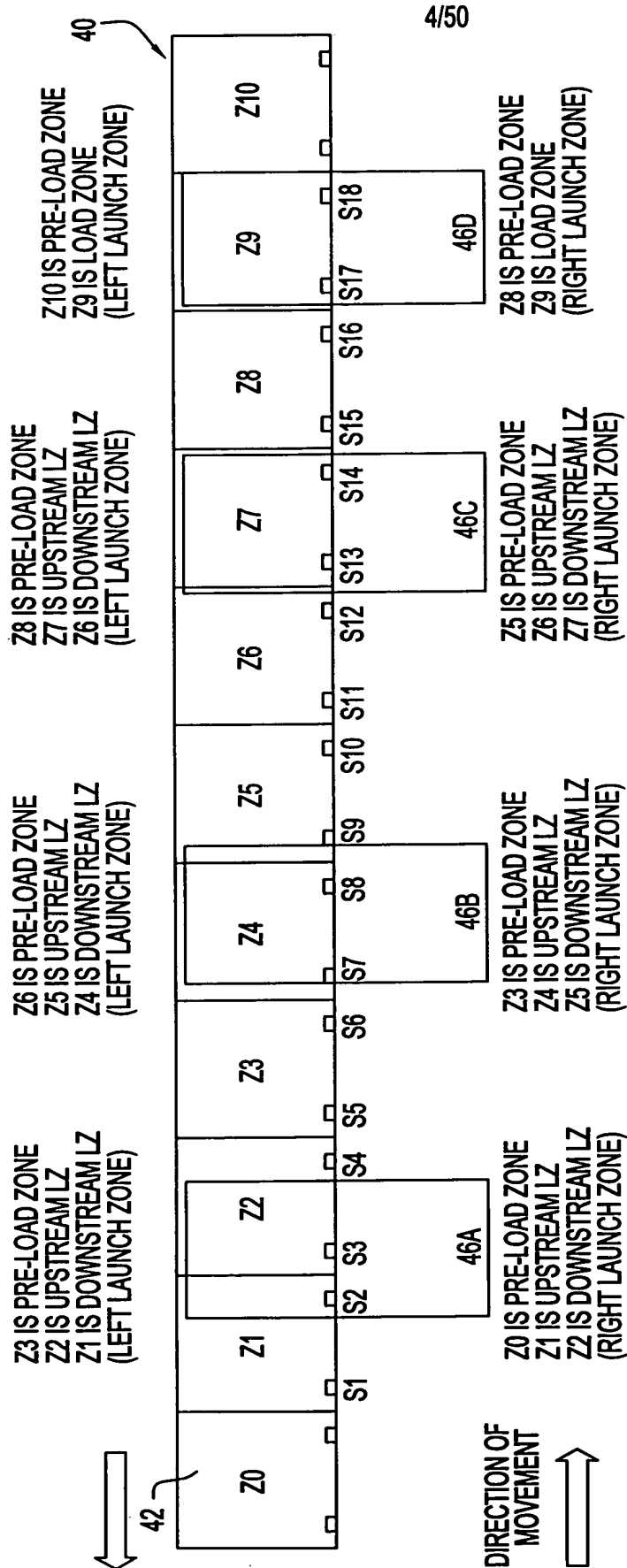


FIG. 2C

NEIGHBORHOOD FOR A RAIL ZONE

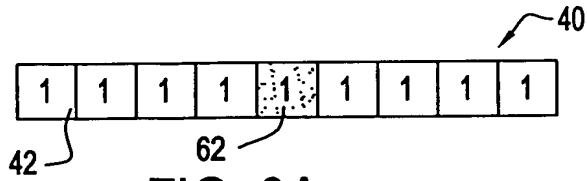
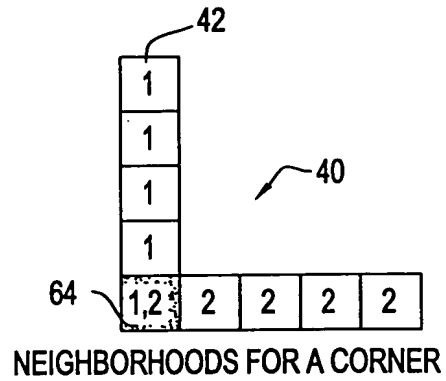


FIG. 3A



NEIGHBORHOODS FOR A CORNER

FIG. 3B

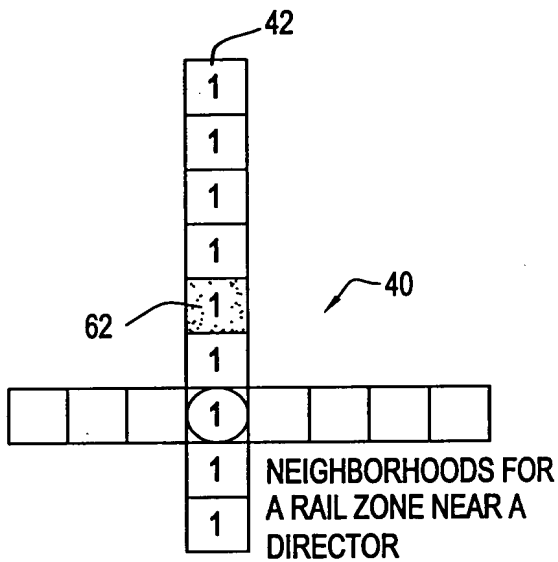
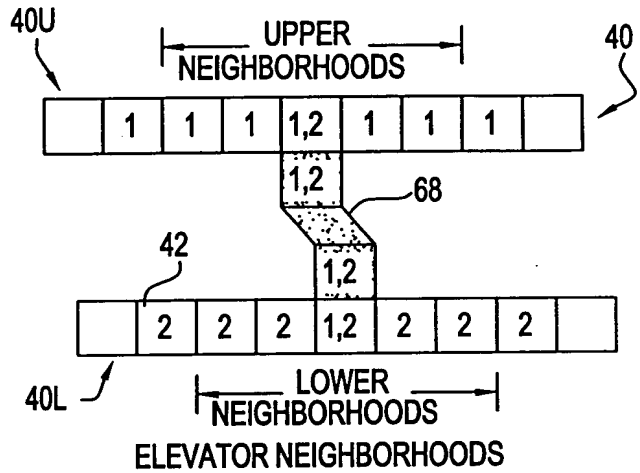
NEIGHBORHOODS FOR
A RAIL ZONE NEAR A
DIRECTOR

FIG. 3C



ELEVATOR NEIGHBORHOODS

FIG. 3D

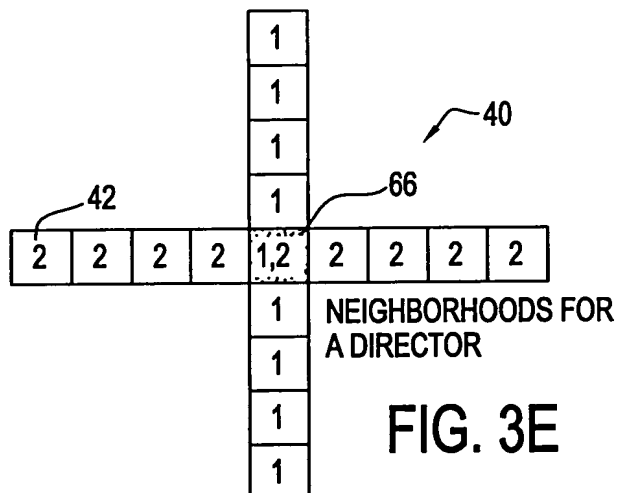
NEIGHBORHOODS FOR
A DIRECTOR

FIG. 3E

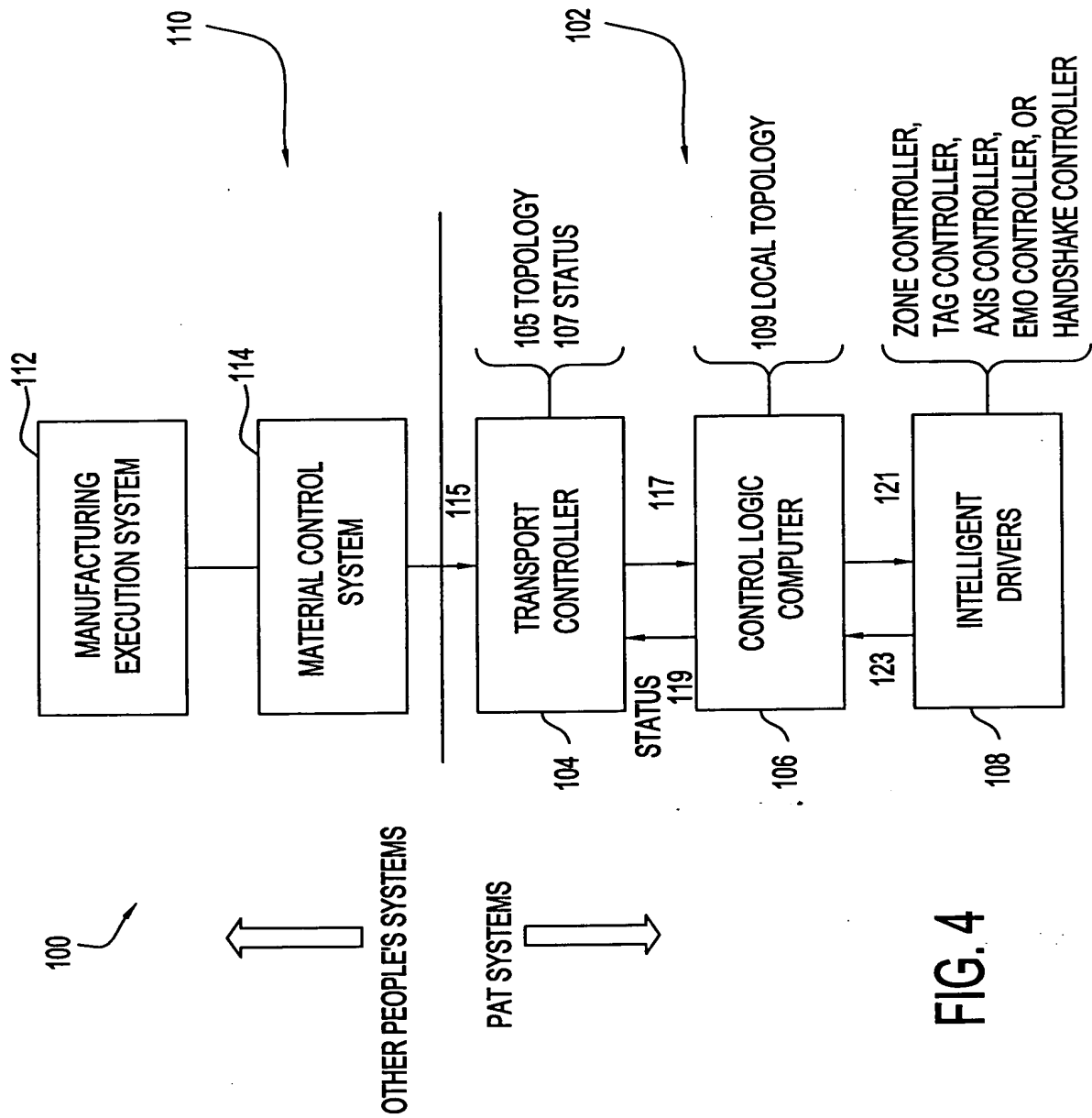


FIG. 4

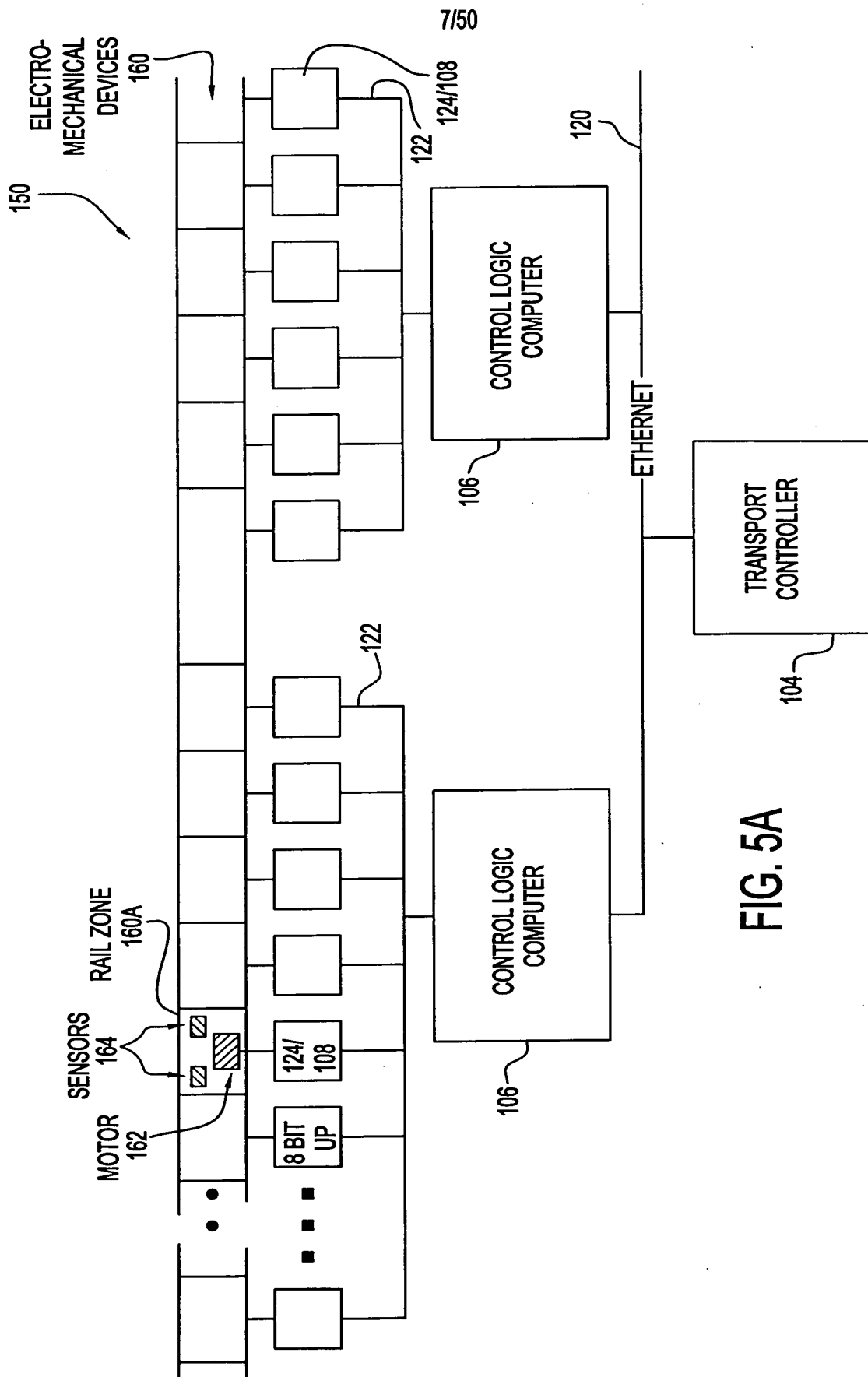


FIG. 5A

CONVEYER RAIL WITH INTELLIGENT DRIVERS SHOWN

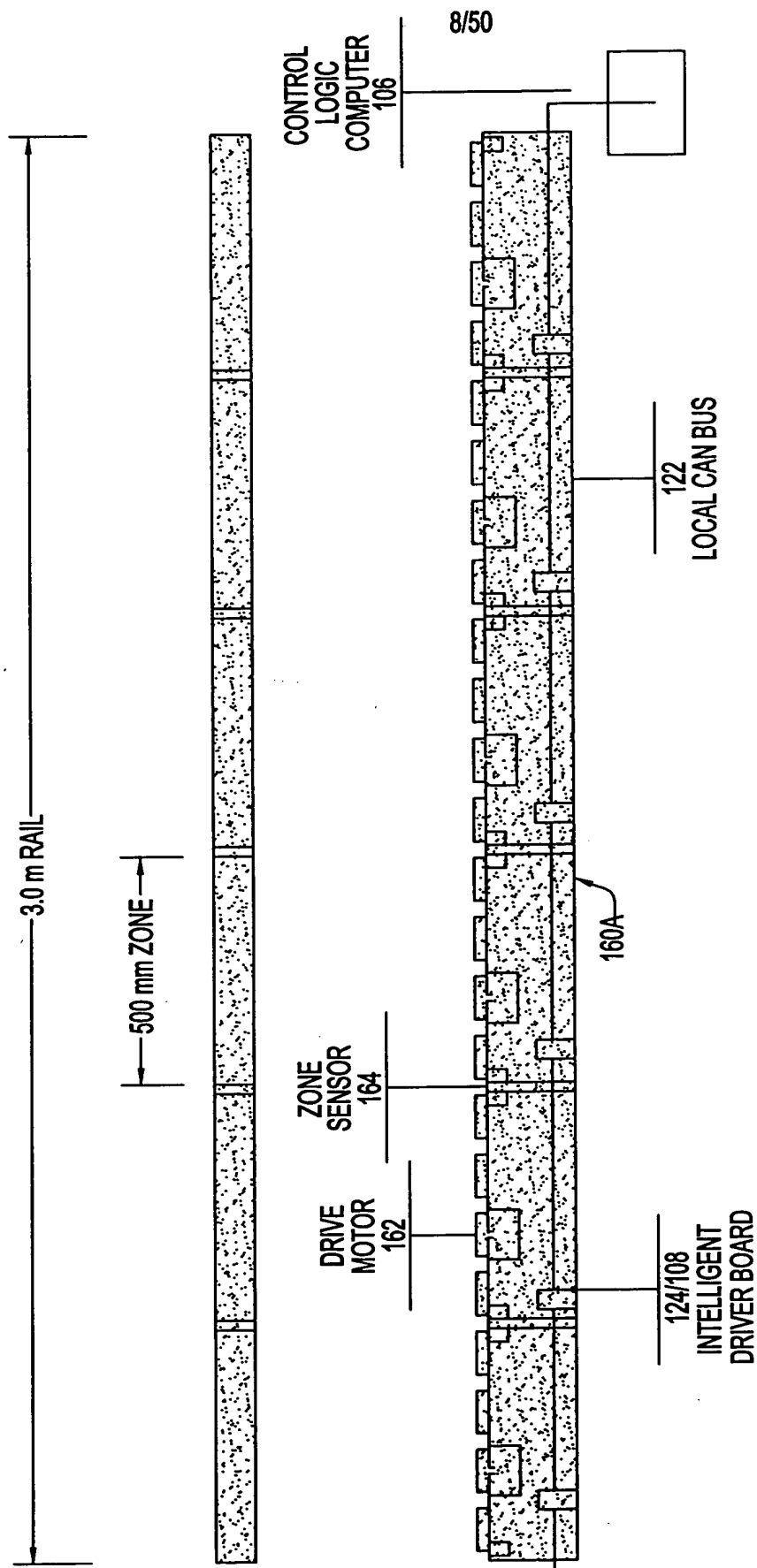


FIG. 5B

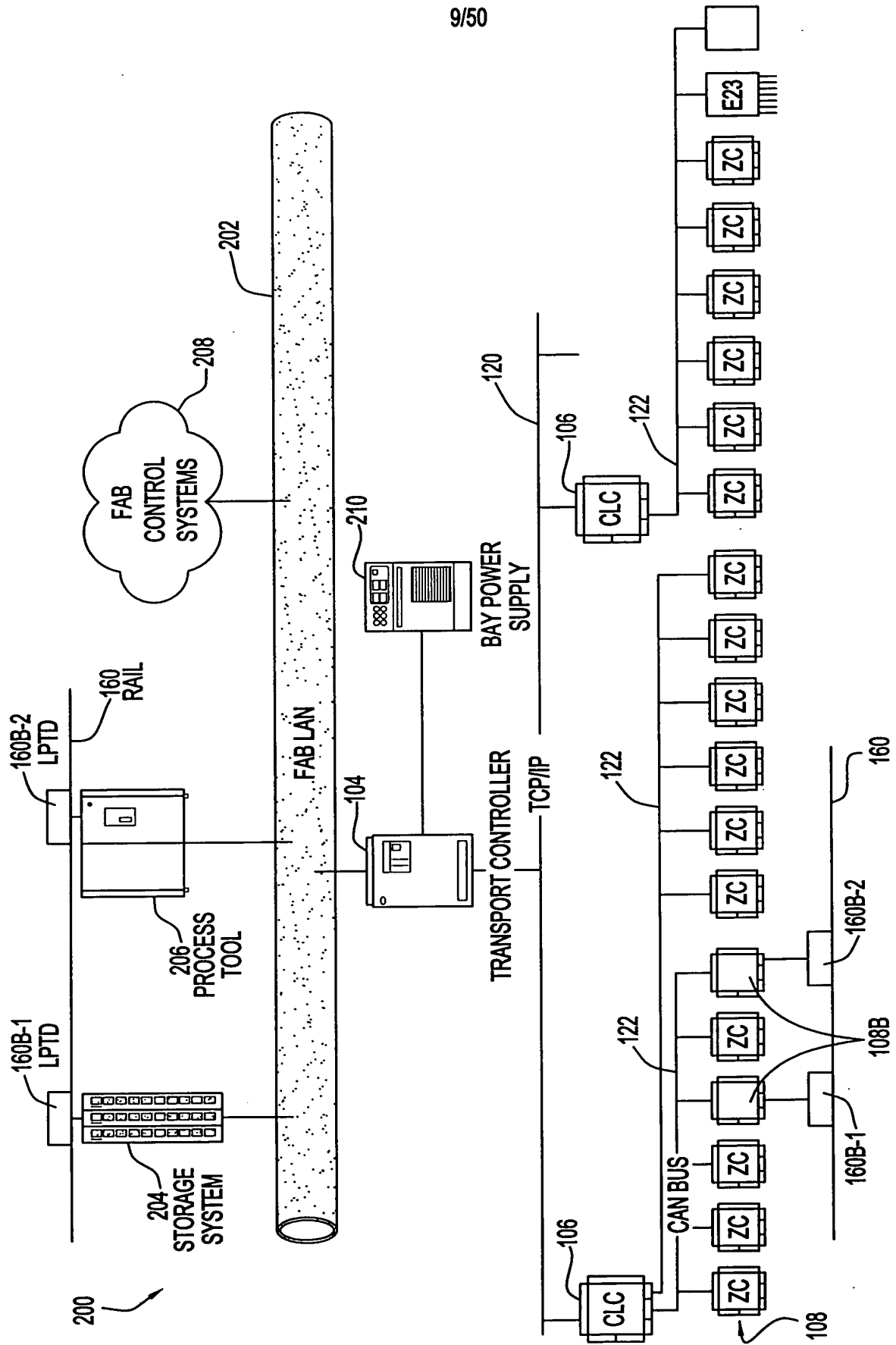


FIG. 6

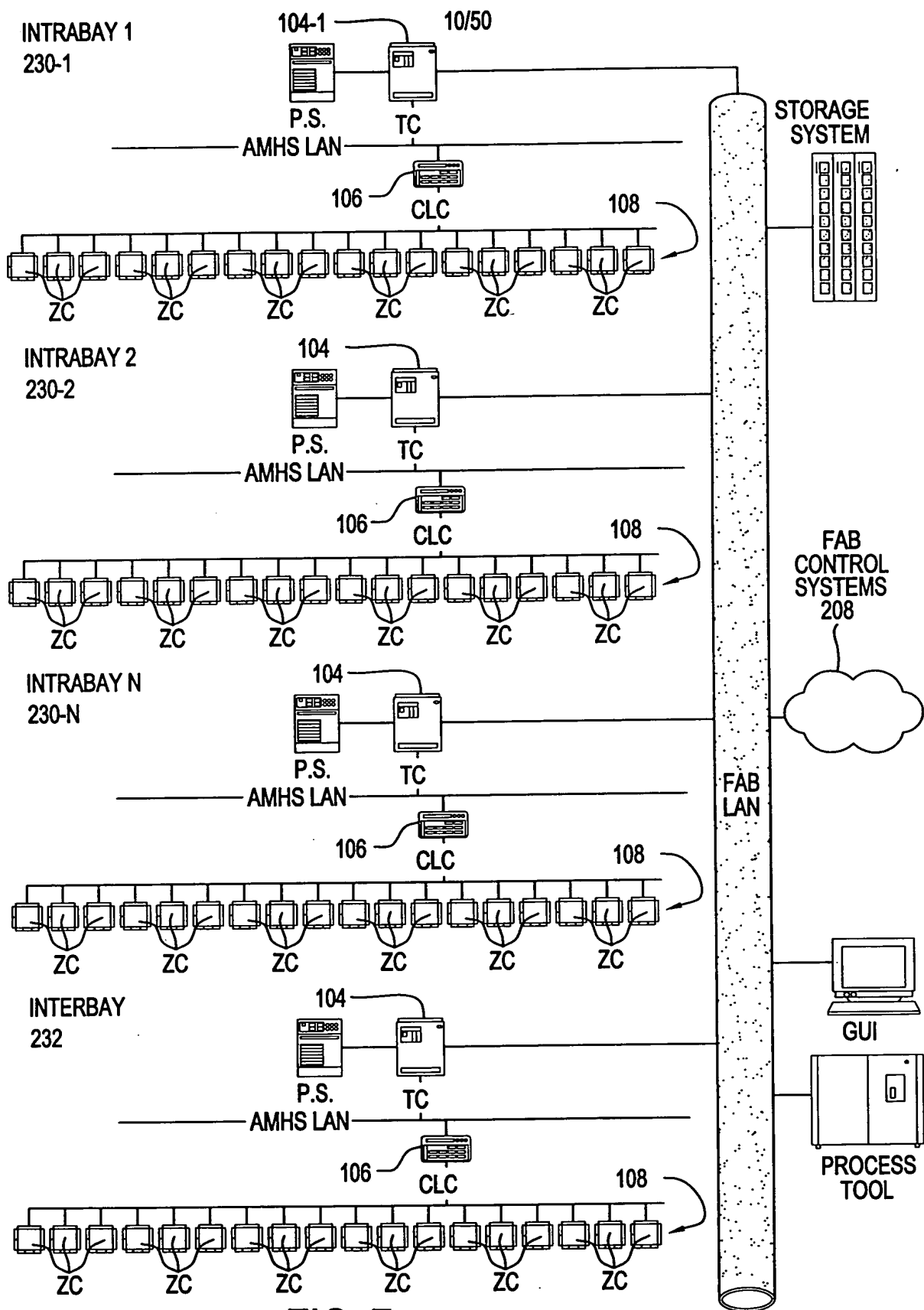


FIG. 7

11/50

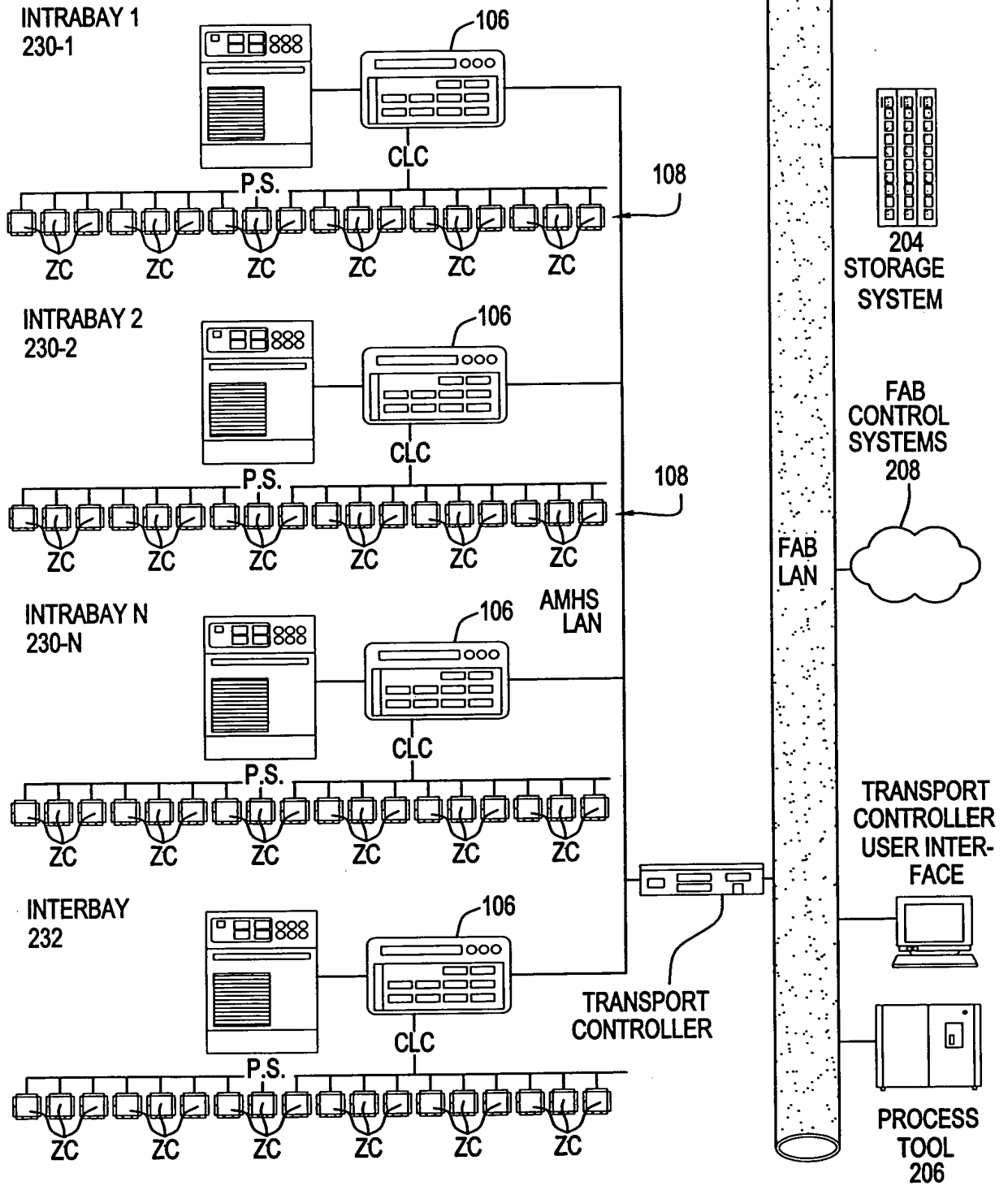


FIG. 8

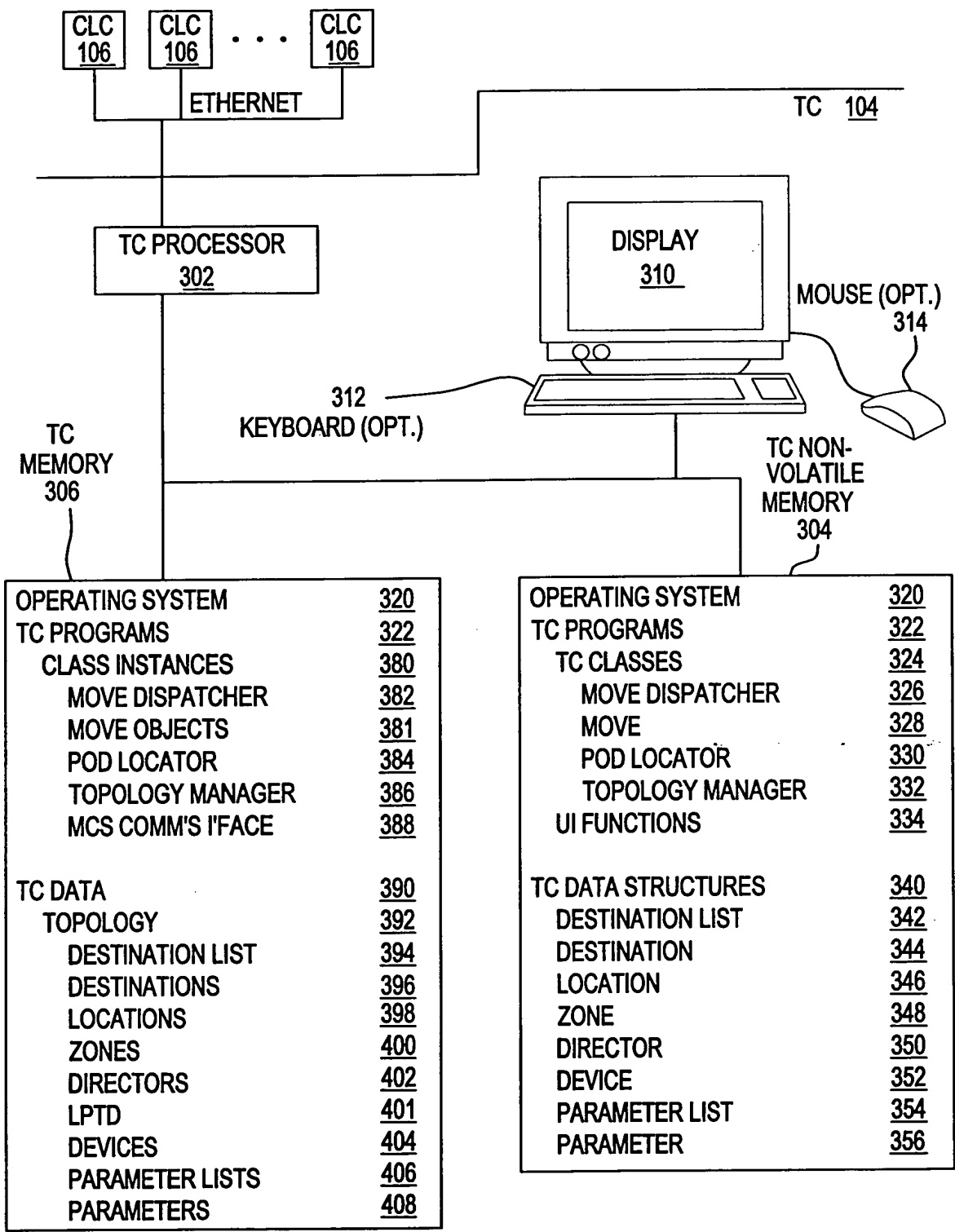


FIG. 9A

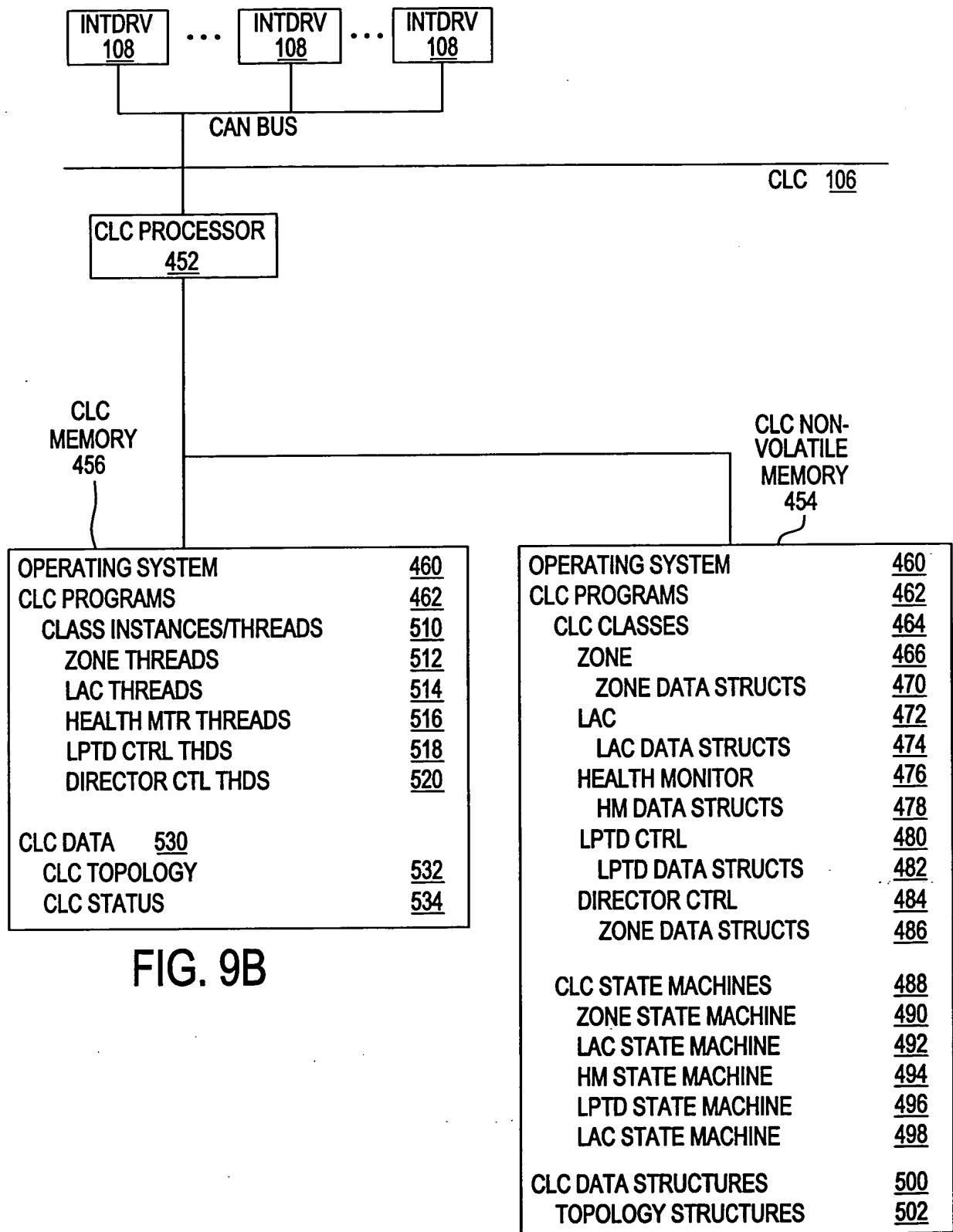
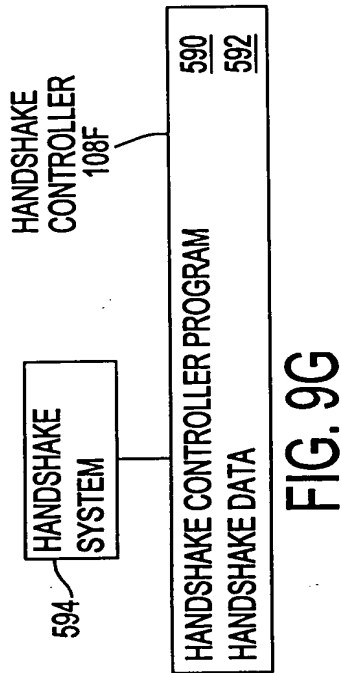
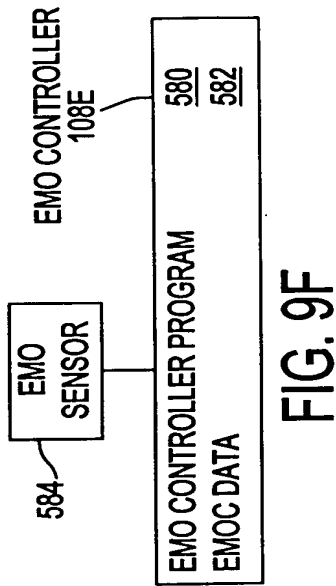
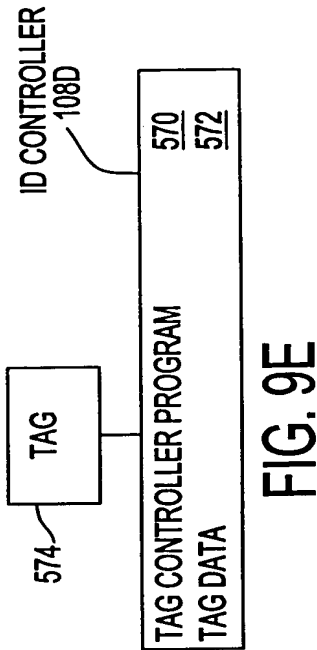
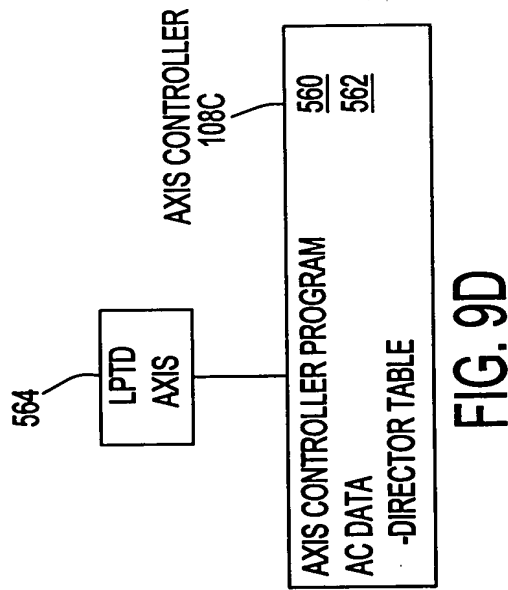
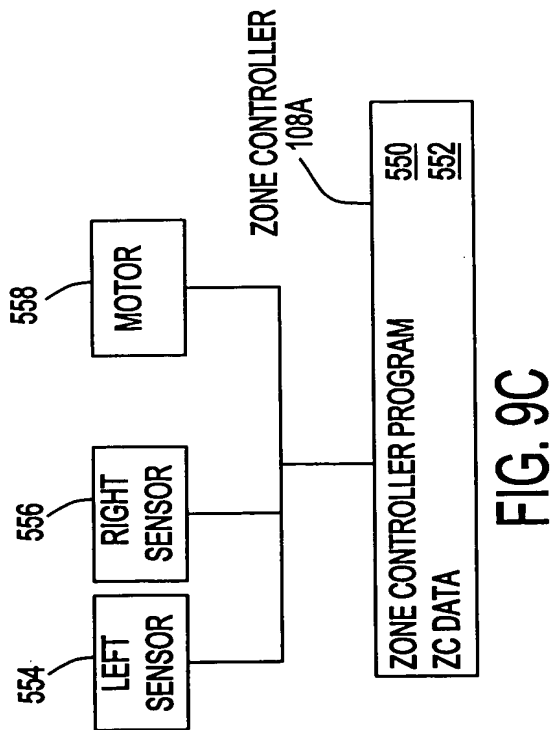


FIG. 9B



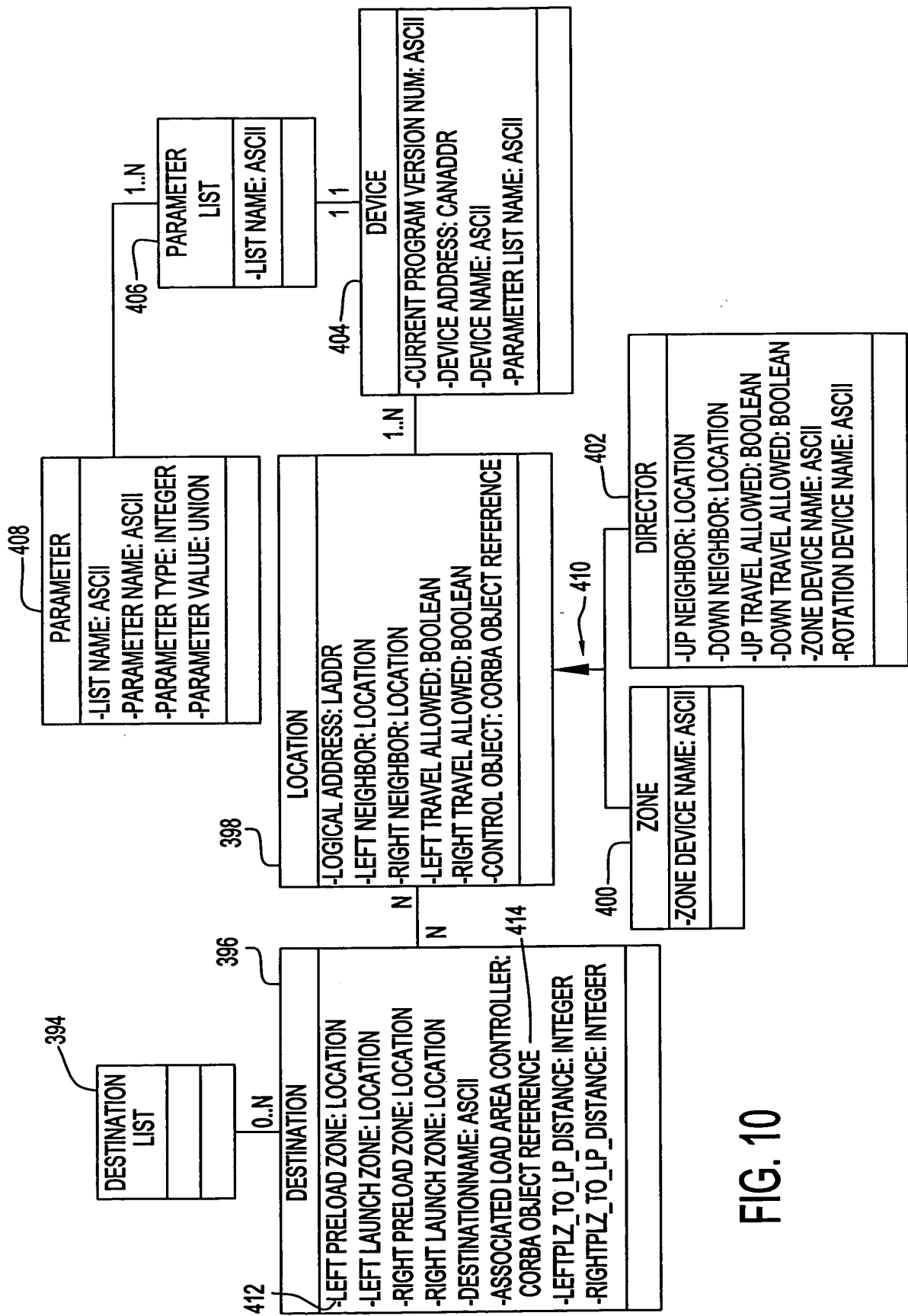


FIG. 10

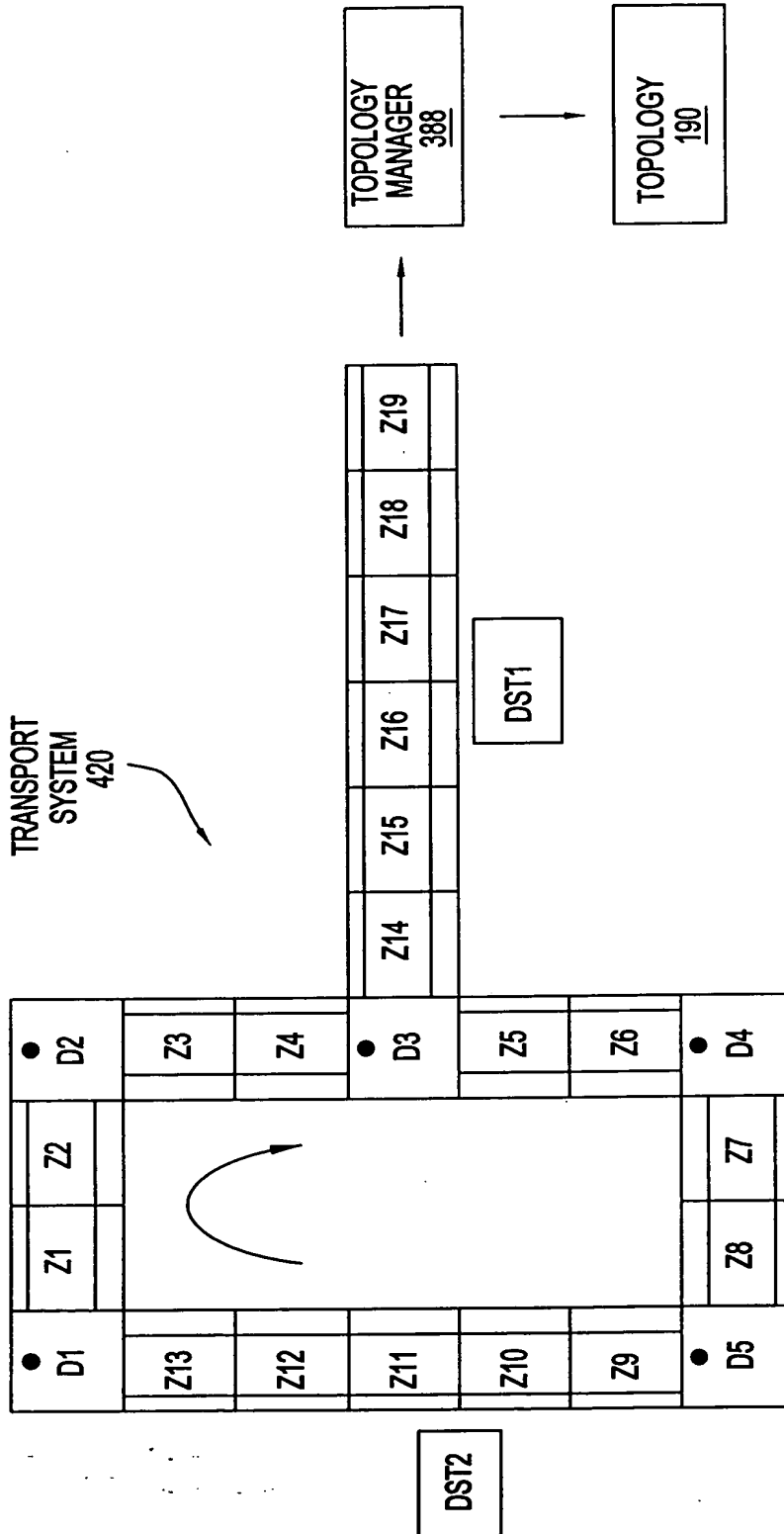
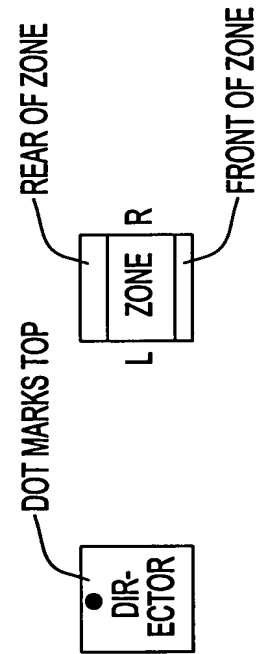


FIG. 11



TOPOLOGY
392

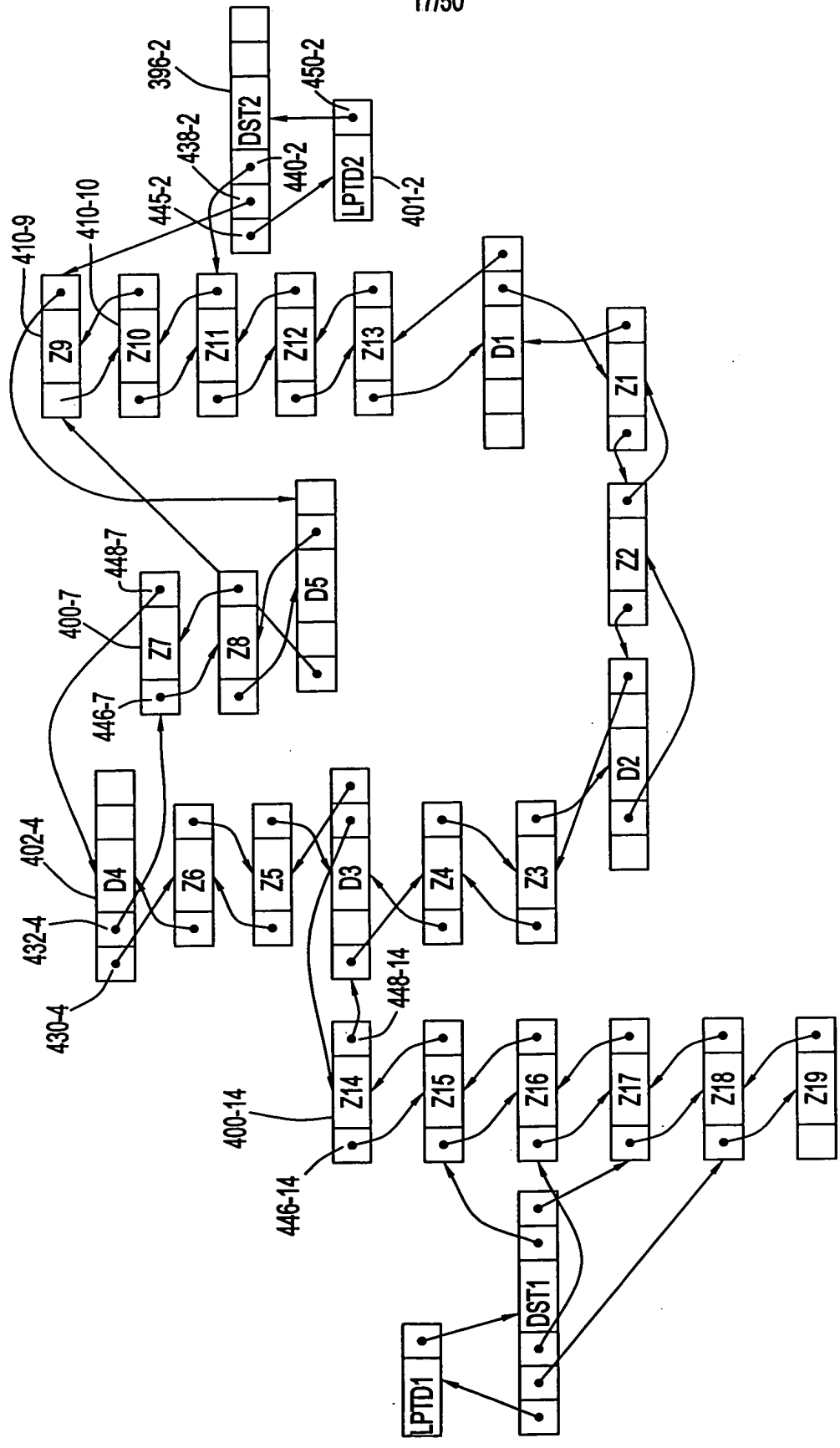


FIG. 12A

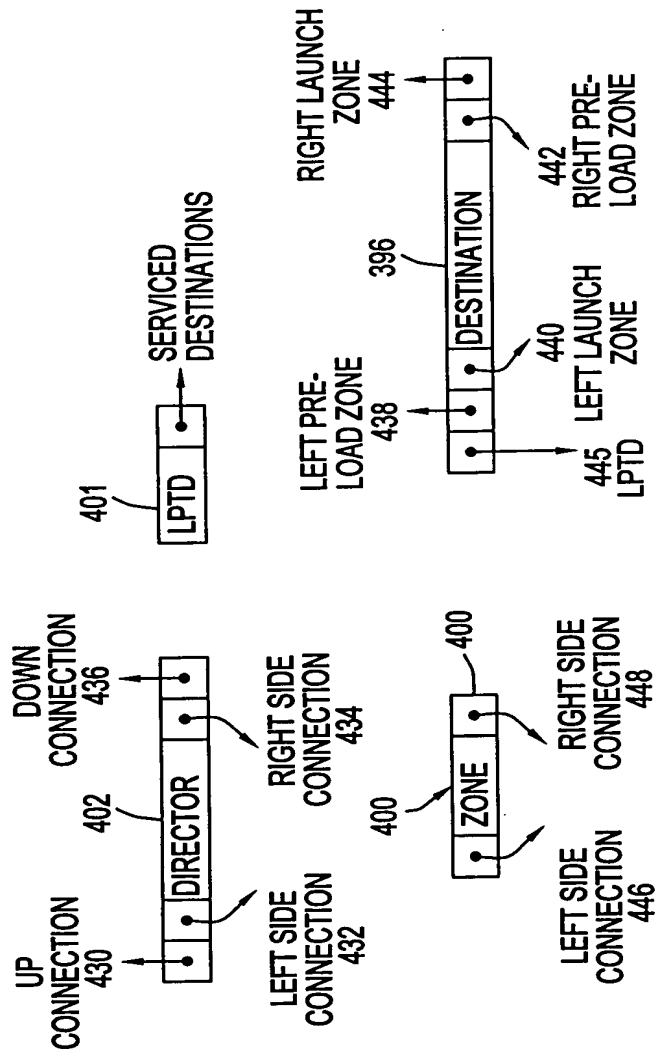
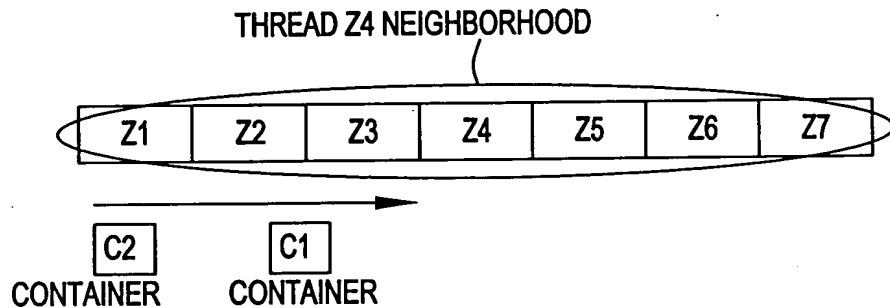


FIG. 12B



ZONE Z4 THREAD 512-4

ZONE STATE MACHINE	<u>620</u>
ZONE THREAD METHODS	<u>622</u>
ZONE Z4 DATA	<u>624</u>
NEIGHBOR STATUS:	<u>626</u>
ZONE Z1 STATUS	<u>628</u>
STATUS {CARRIER EXITING, CARRIER EXITED,	
CARRIER STOPPED, CARRIER REMOVED,	
ZONE AVAILABLE, ZONE RESERVED};	
MAXIMUM SPEED;	<u>630</u>
ZONE Z2 STATUS	<u>632</u>
ZONE Z3 STATUS	<u>634</u>
ZONE Z5 STATUS	<u>636</u>
ZONE Z6 STATUS	<u>638</u>
ZONE Z7 STATUS	<u>640</u>
CONTAINERS QUEUE	<u>642</u>
CONTAINER C1	<u>644</u>
CONTAINER C2	<u>646</u>
NEAREST CONTAINER PTR (=C1)	<u>648</u>
...	
DOWNSTREAM SPEED TABLE;	<u>670</u>
UPSTREAM SPEED COMMAND;	<u>672</u>
MAXIMUM SPEED;	<u>674</u>
SPEED TABLE RULES)	<u>676</u>

FIG. 13

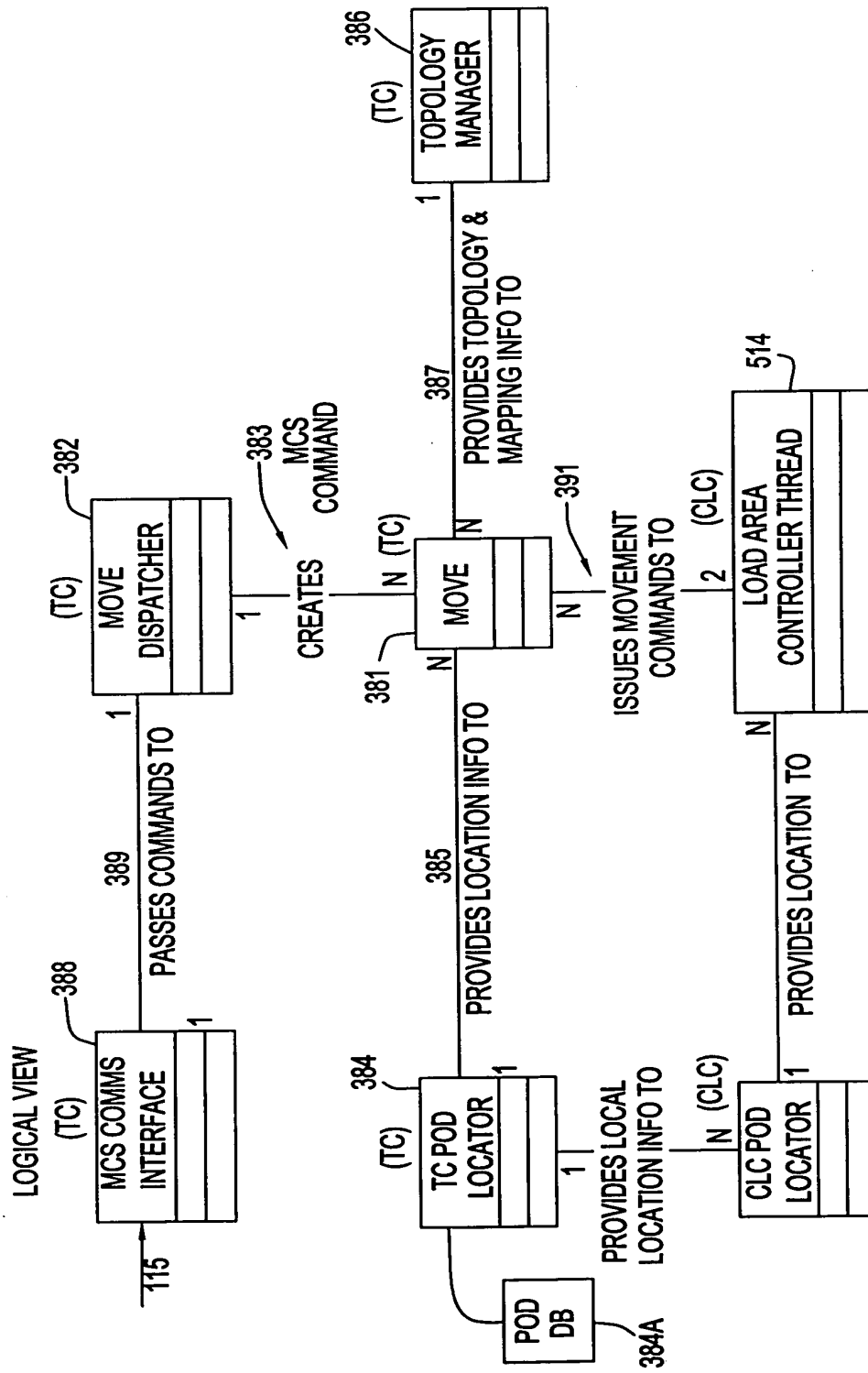


FIG. 14

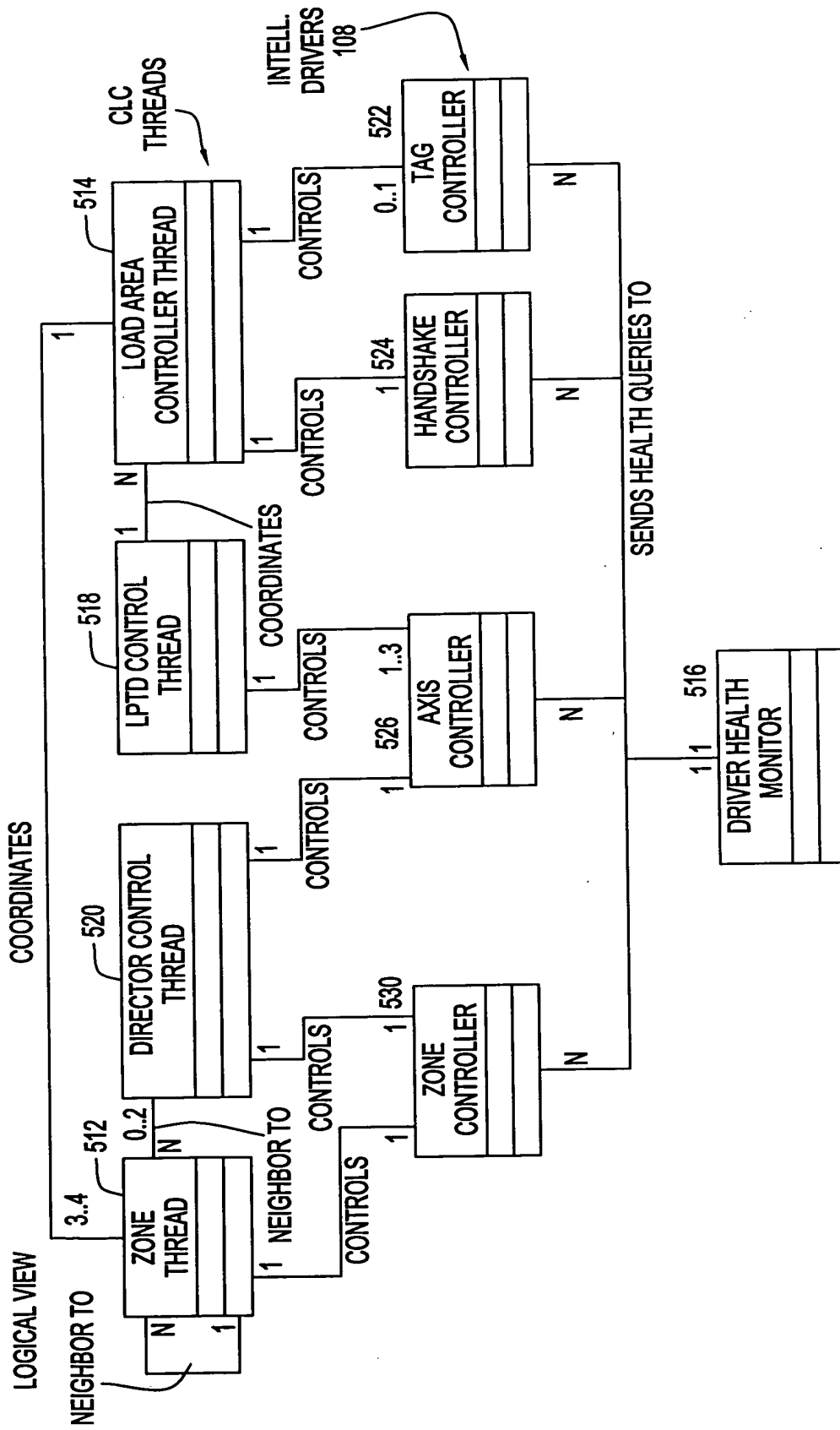
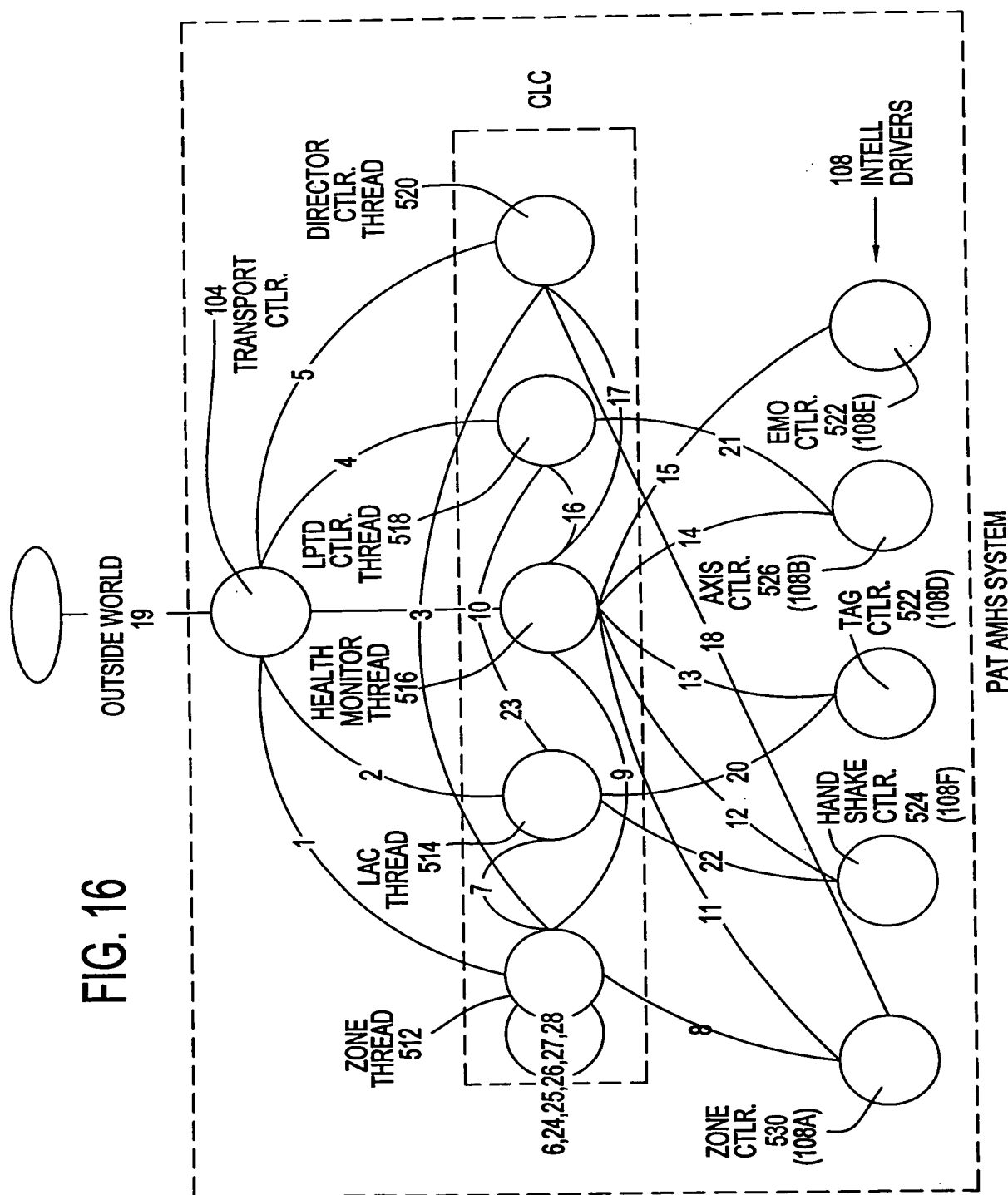


FIG. 15



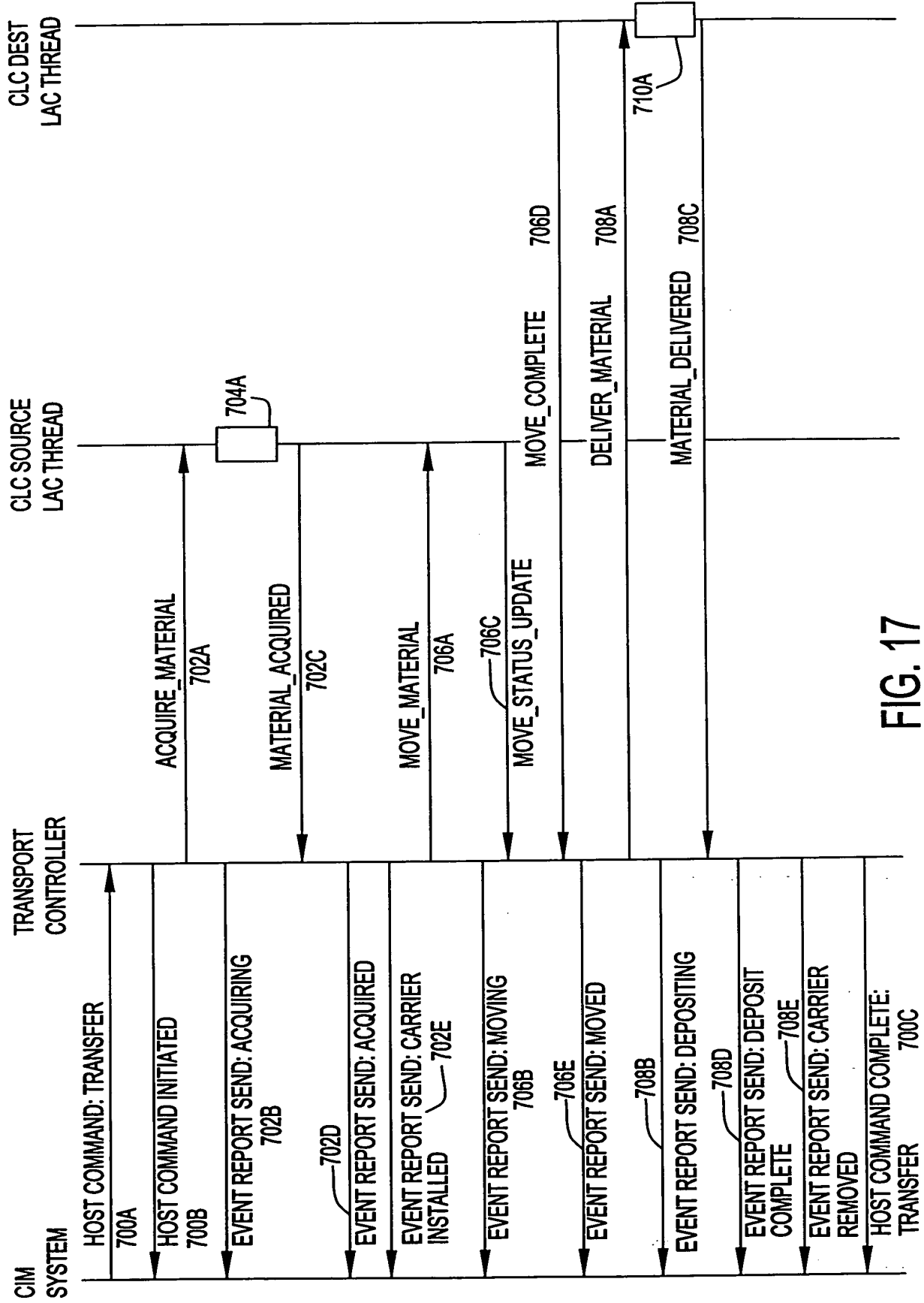


FIG. 17

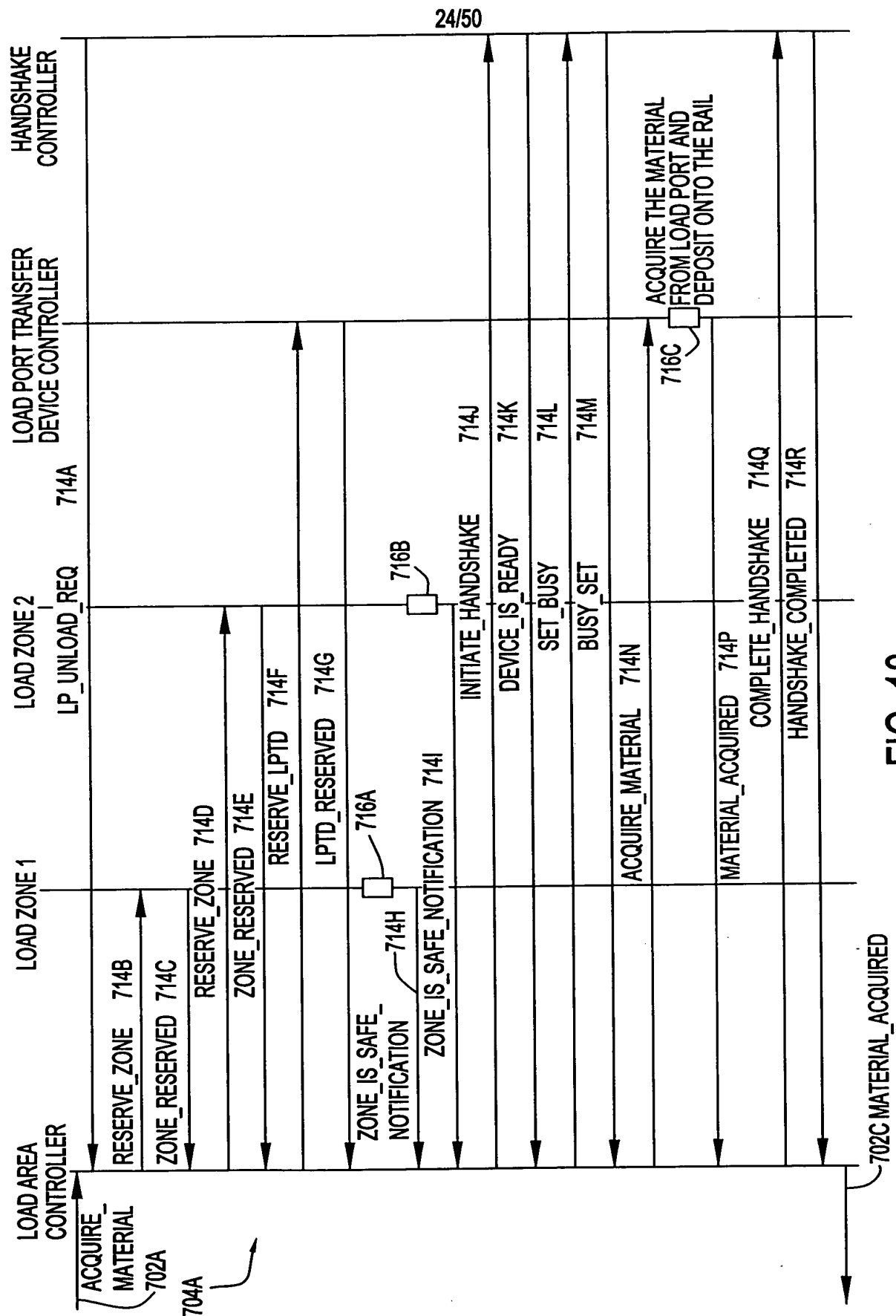


FIG. 18

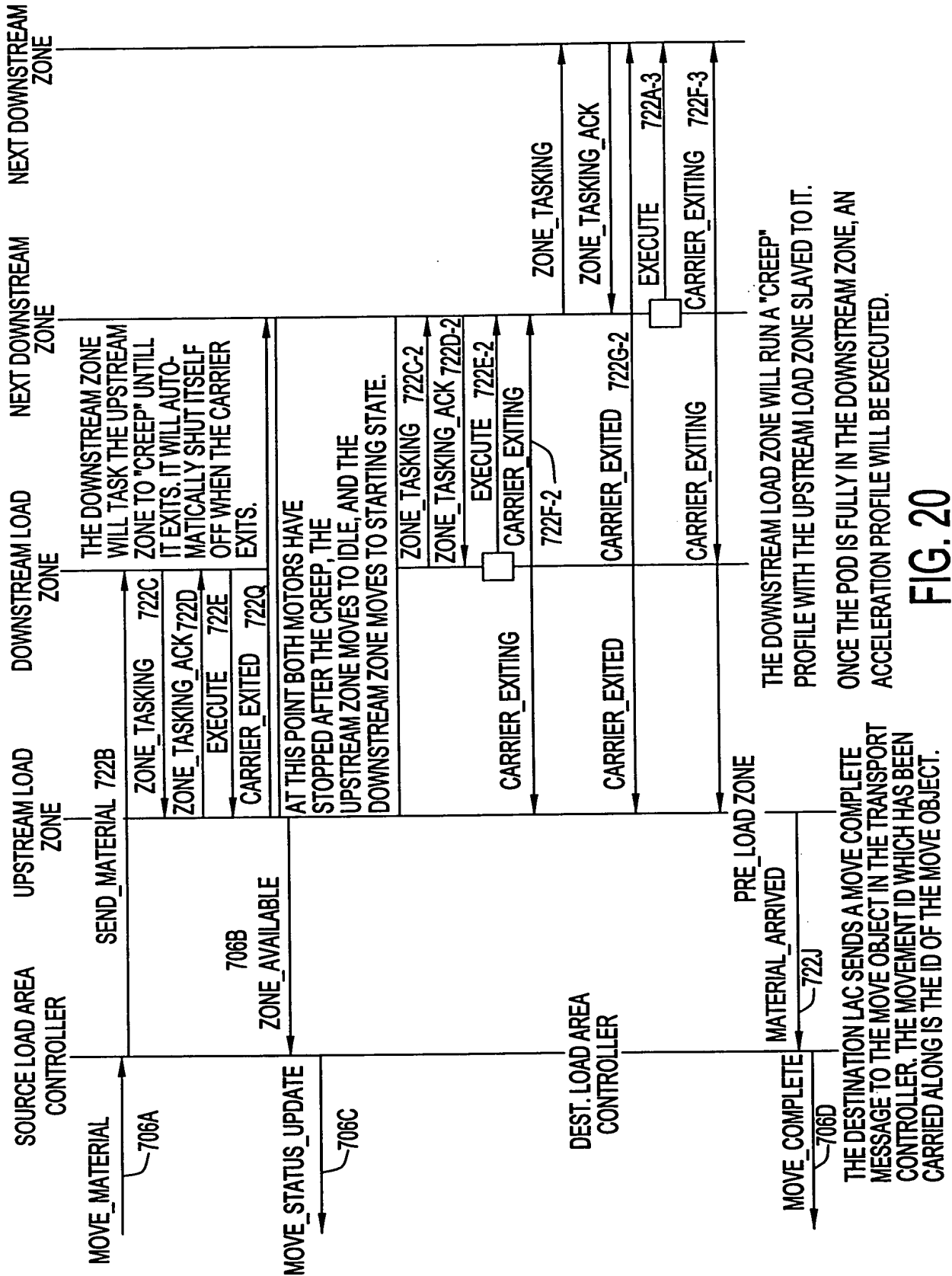
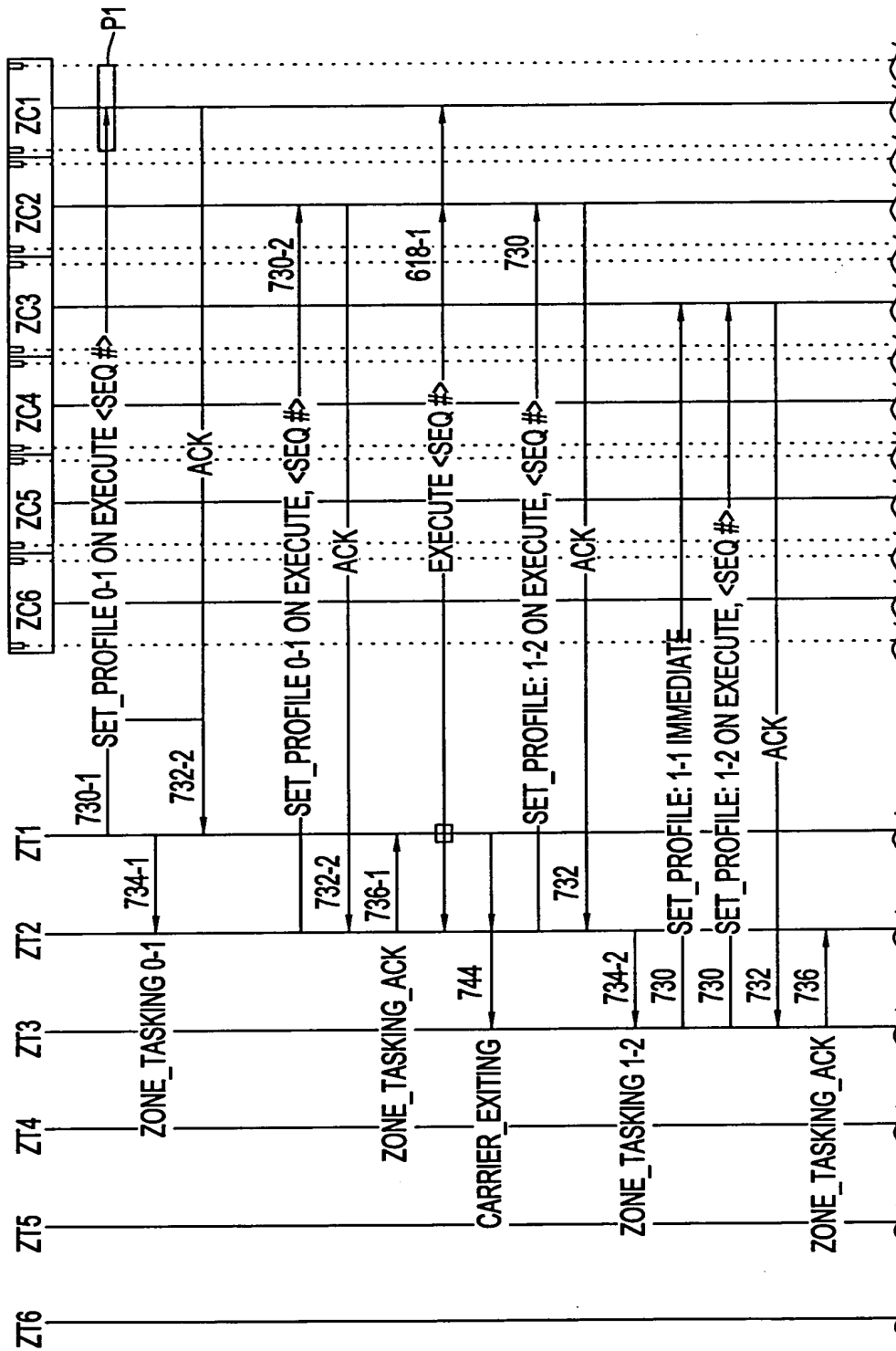
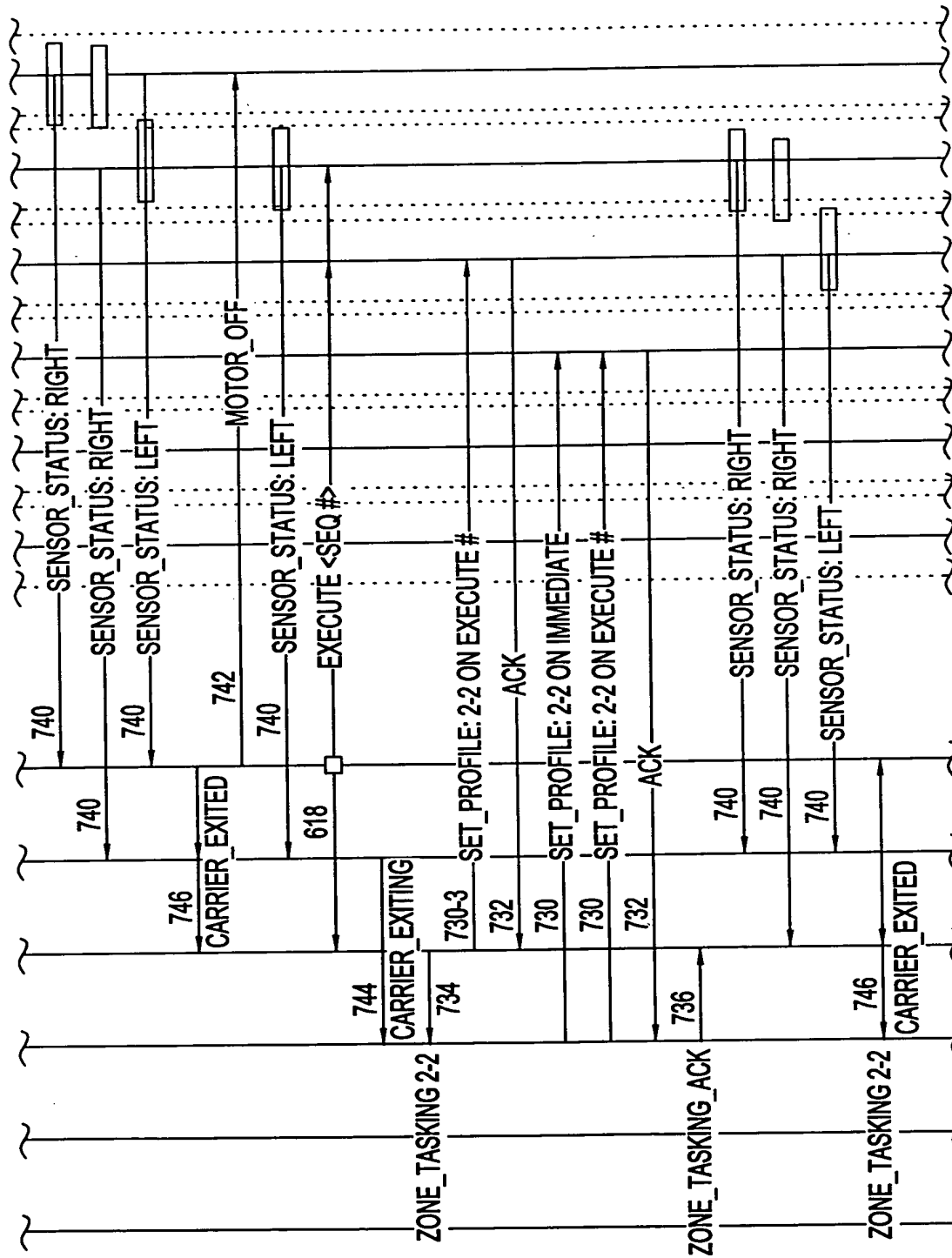


FIG. 20



CONTINUED TO FIG. 21B

FIG. 21 A



CONTINUED TO FIG. 21C

FIG. 21B

CONTINUED FROM FIG. 21B

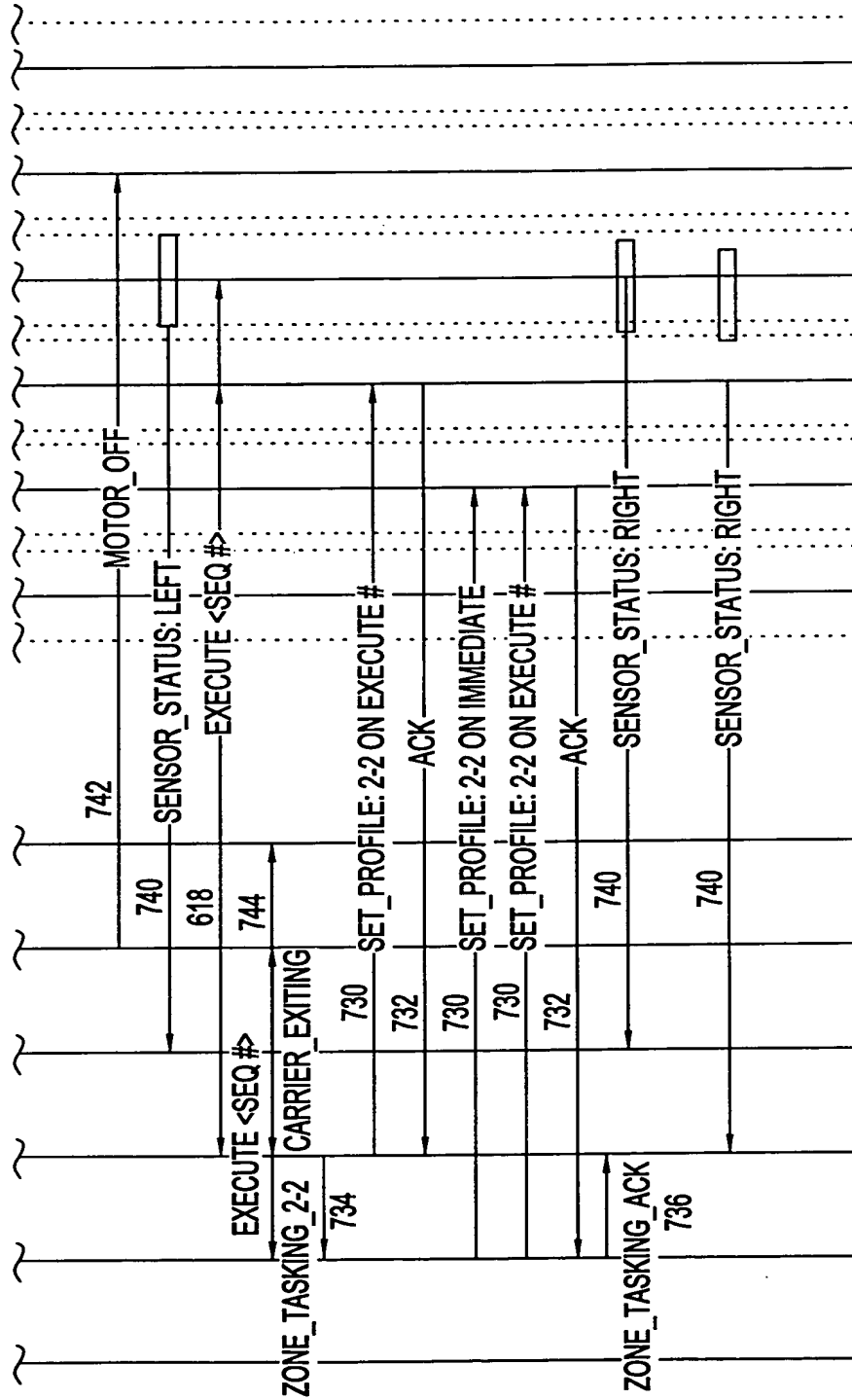
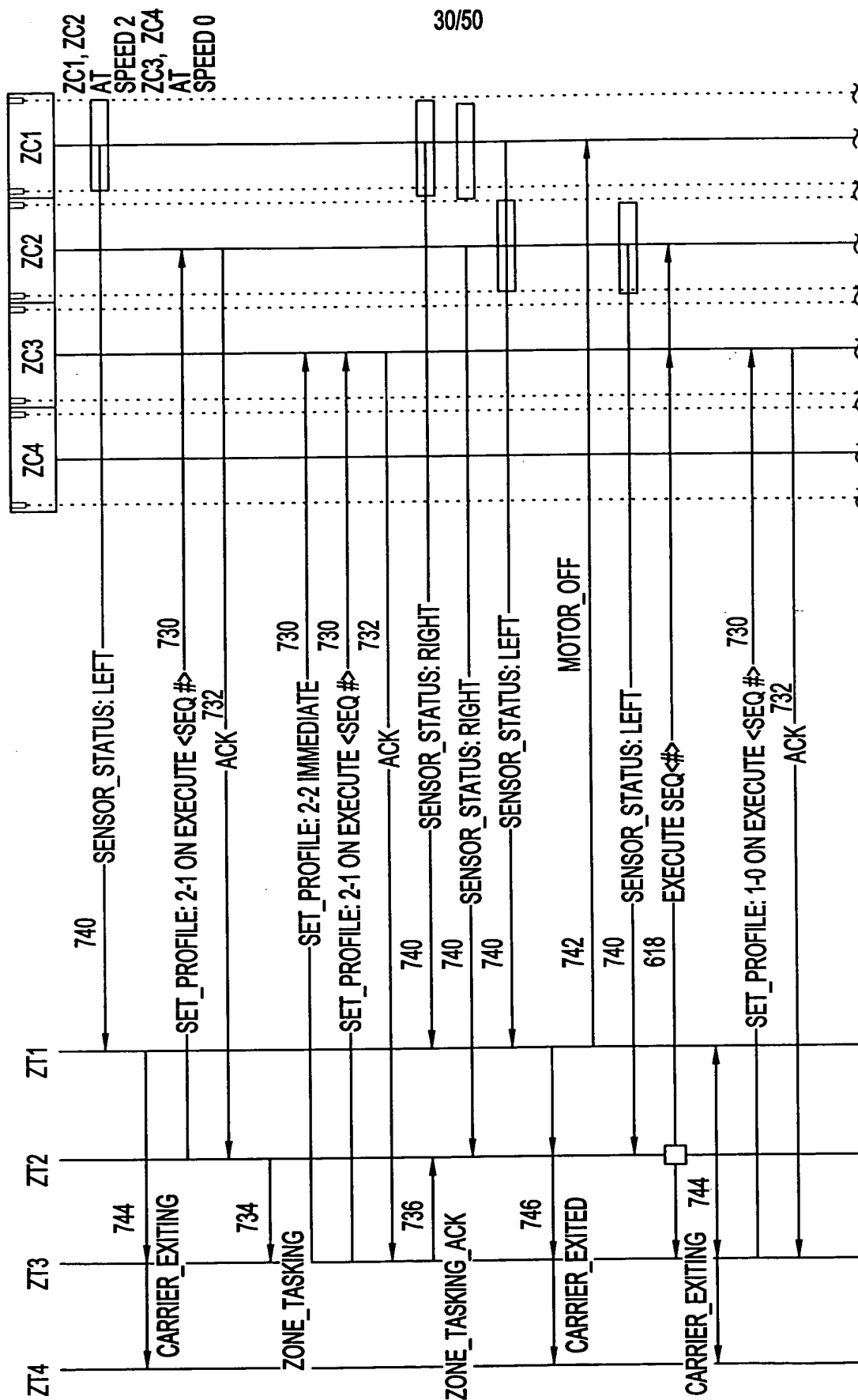


FIG. 21C



CONTINUED TO FIG. 22B

FIG. 22A

CONTINUED FROM FIG. 22A

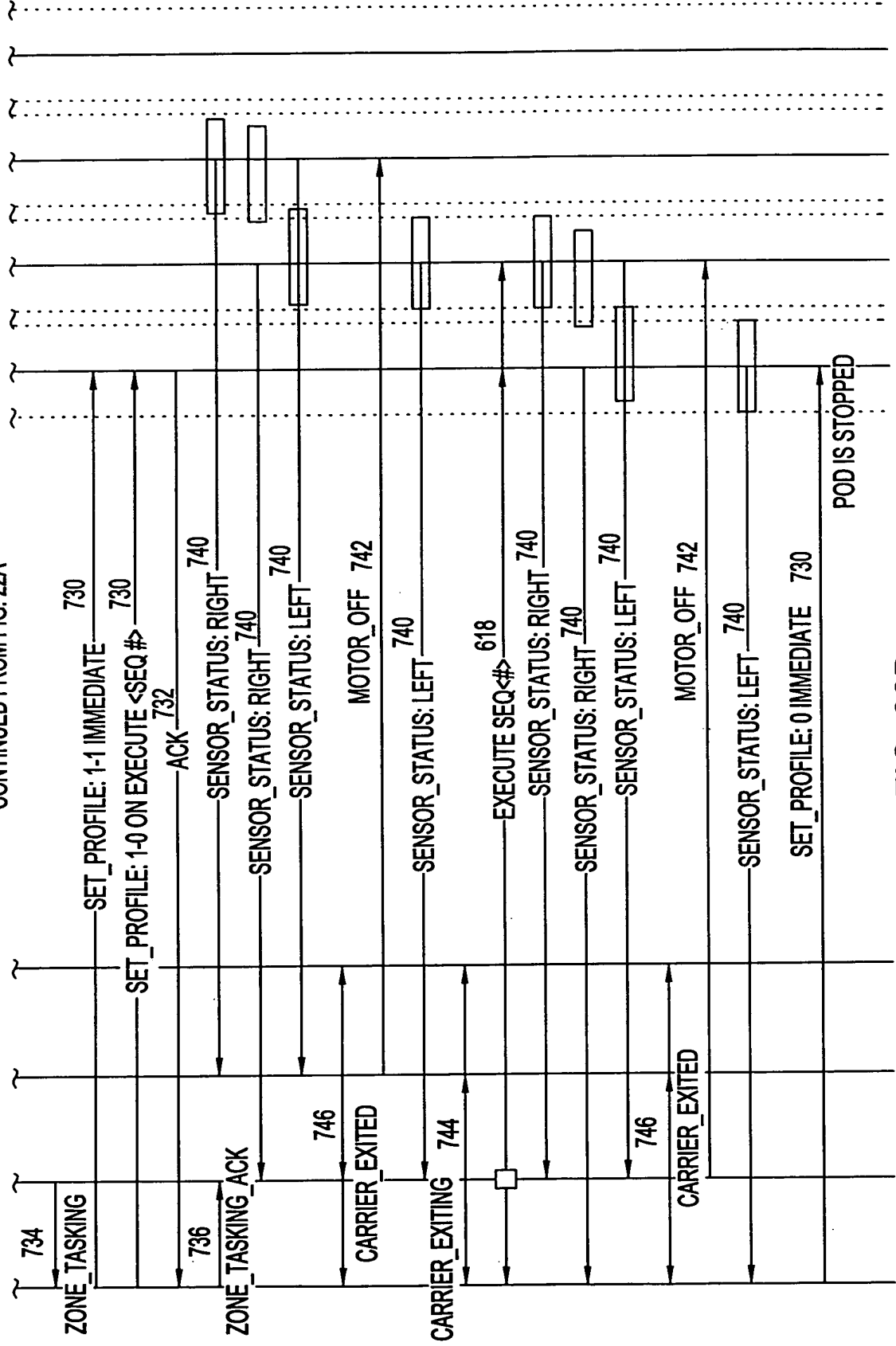
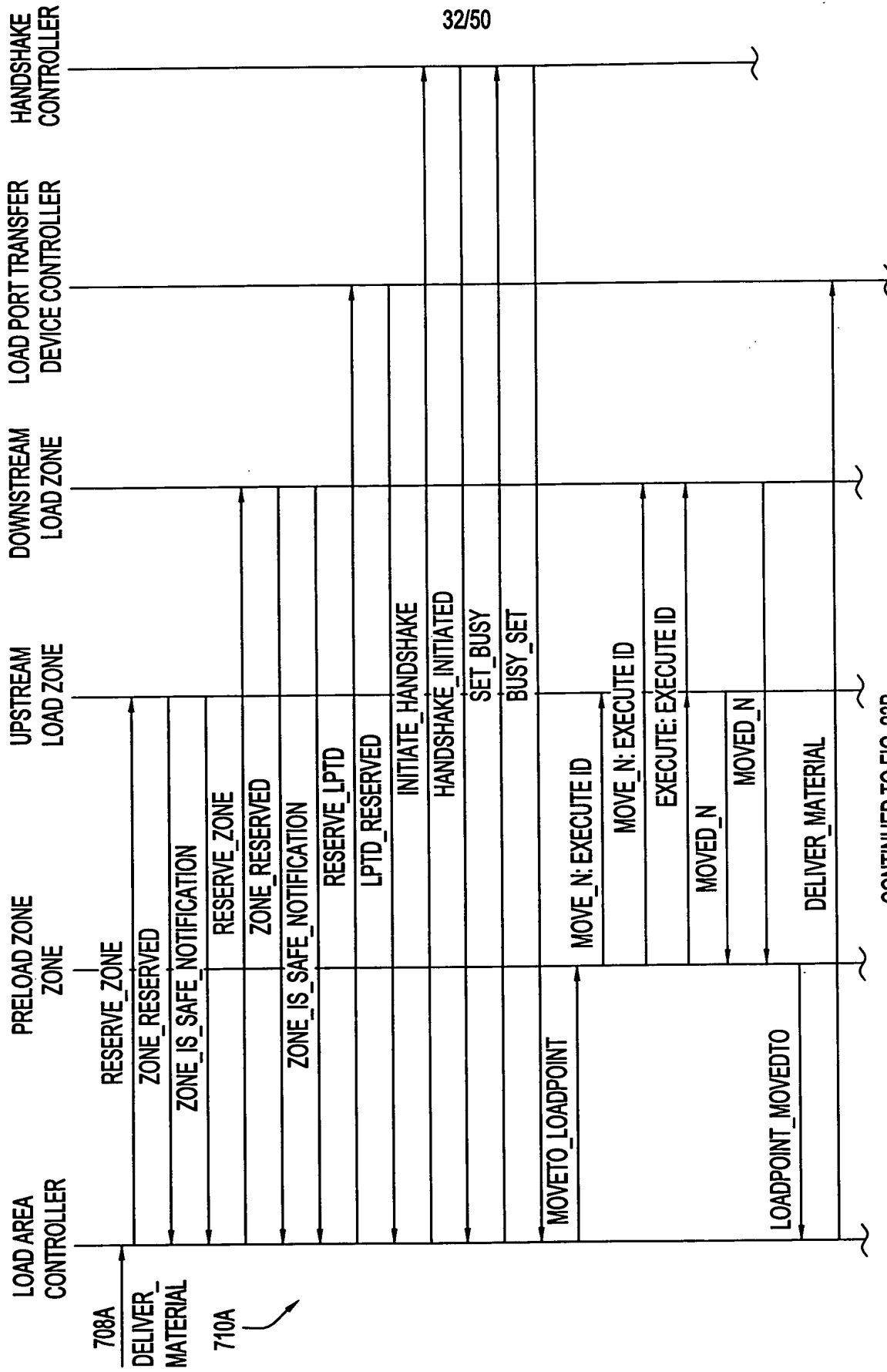


FIG. 22B

FIG. 23A is a sequence diagram illustrating the communication between the Load Area Controller, Preload Zone, Upstream Load Zone, Downstream Load Zone, Load Port Transfer Device Controller, and Handshake Controller. The diagram shows the flow of data and control signals during the material delivery process.



CONTINUED TO FIG. 23B
FIG. 23A

CONTINUED FROM FIG. 23A

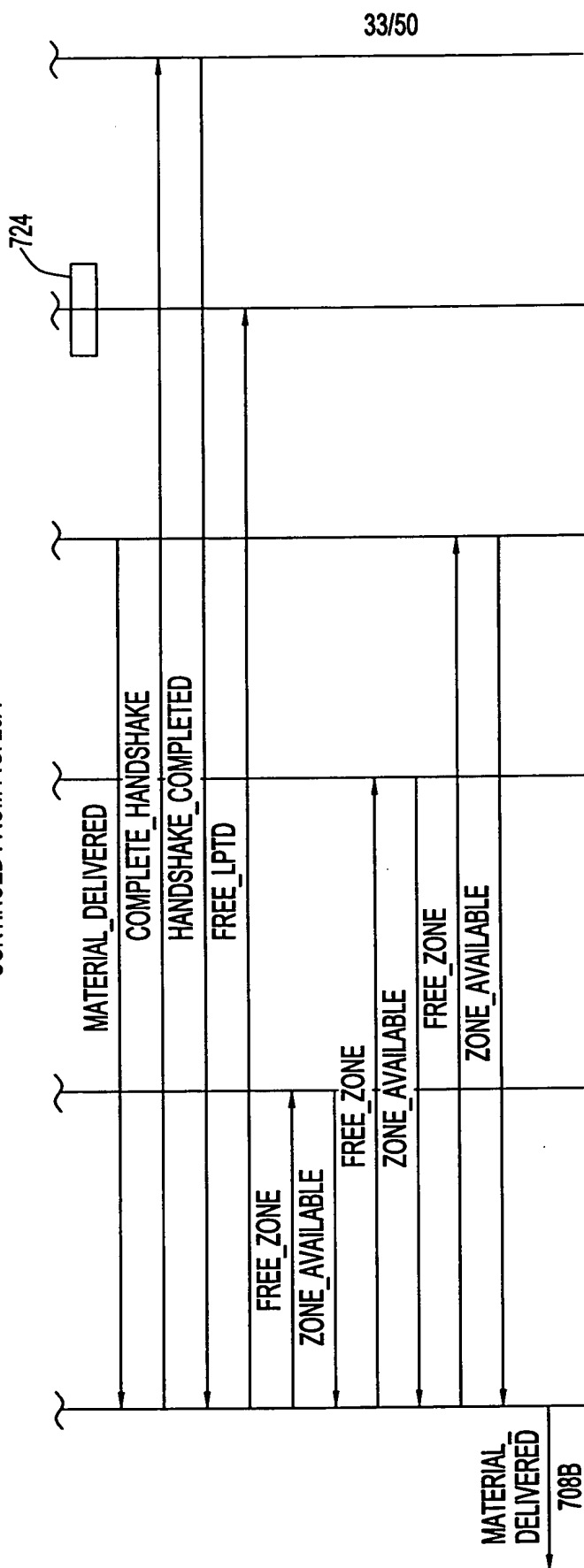


FIG. 23B

FIG. 24A

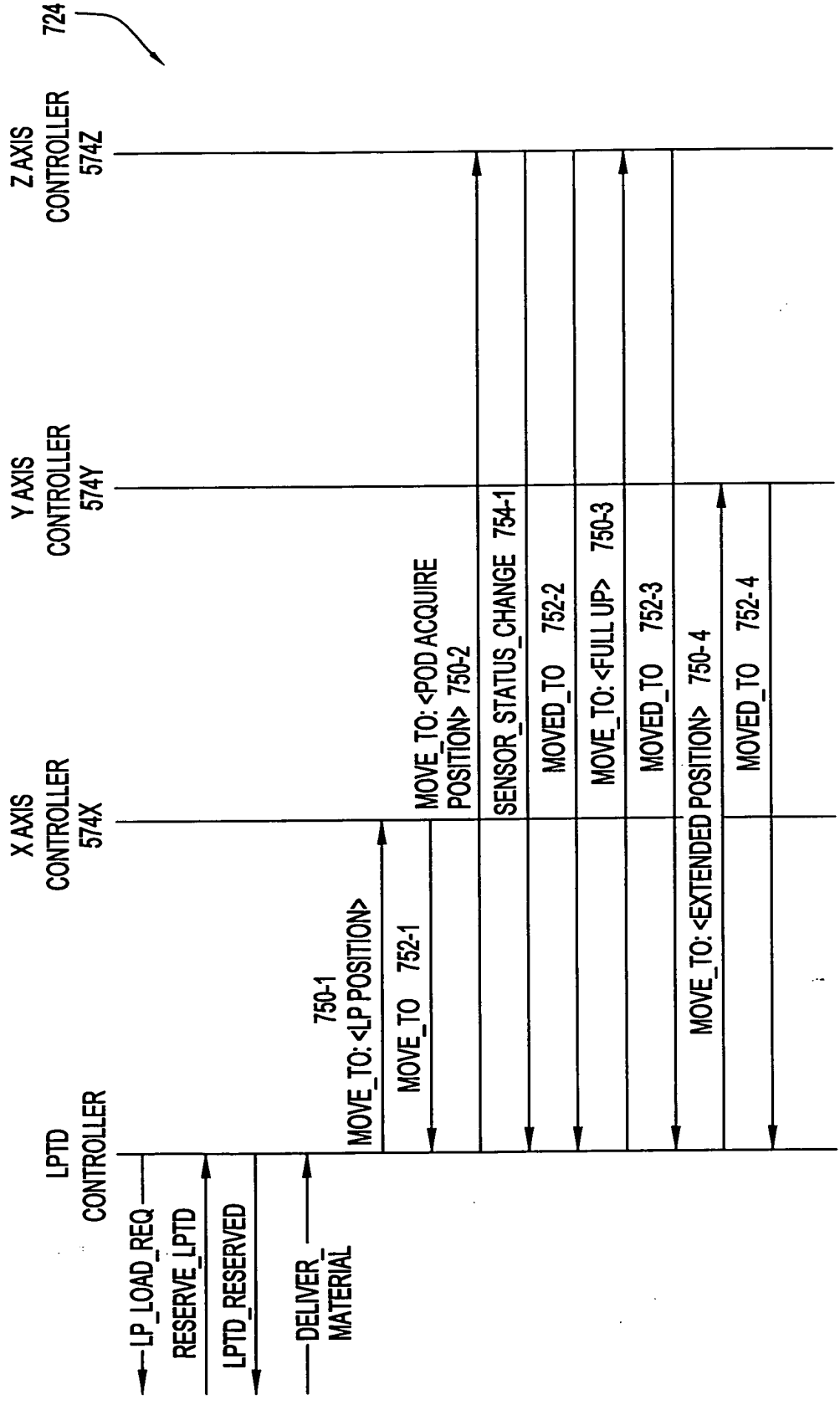


FIG. 24A

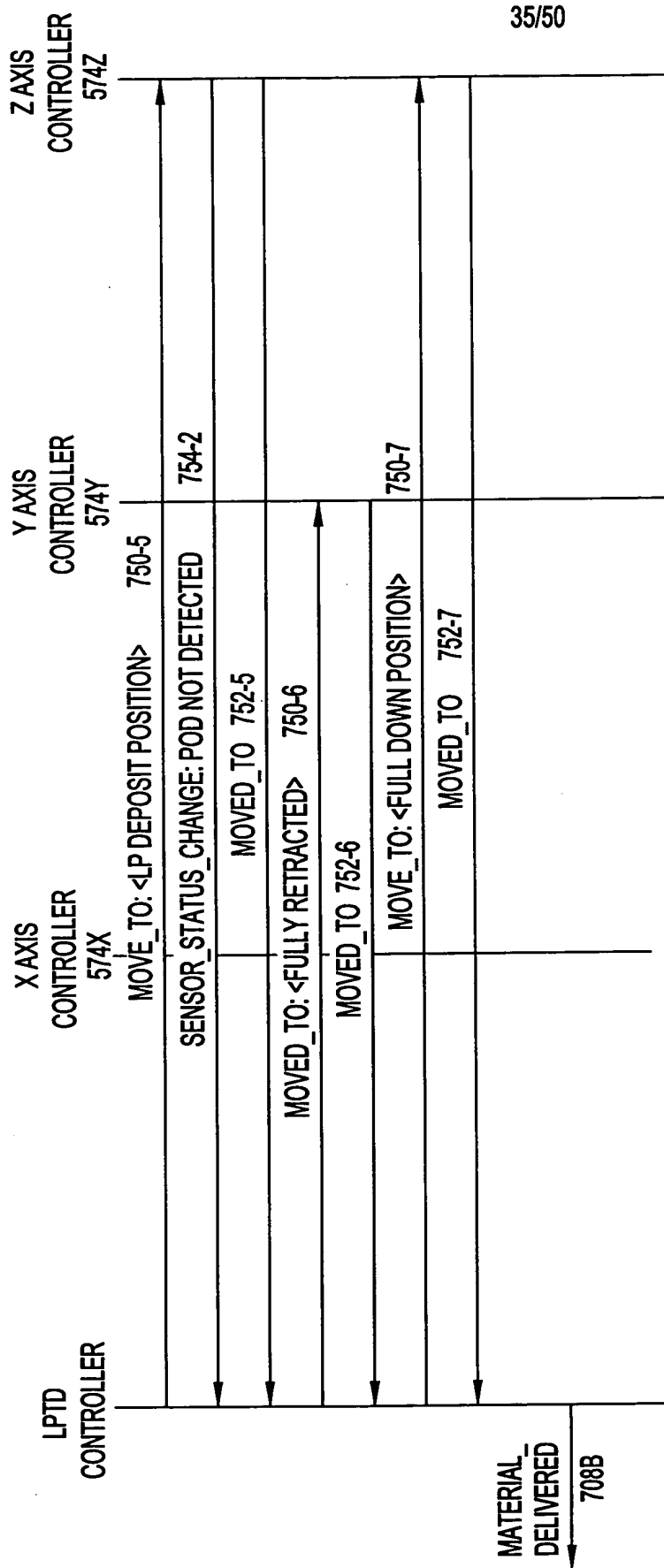


FIG. 24B

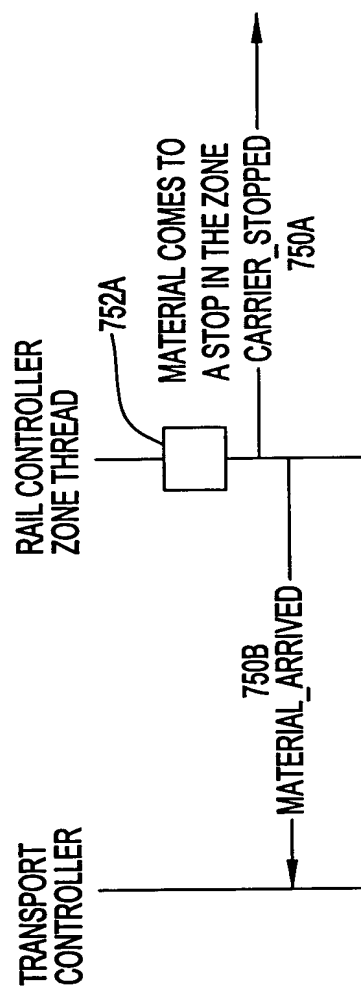


FIG. 25

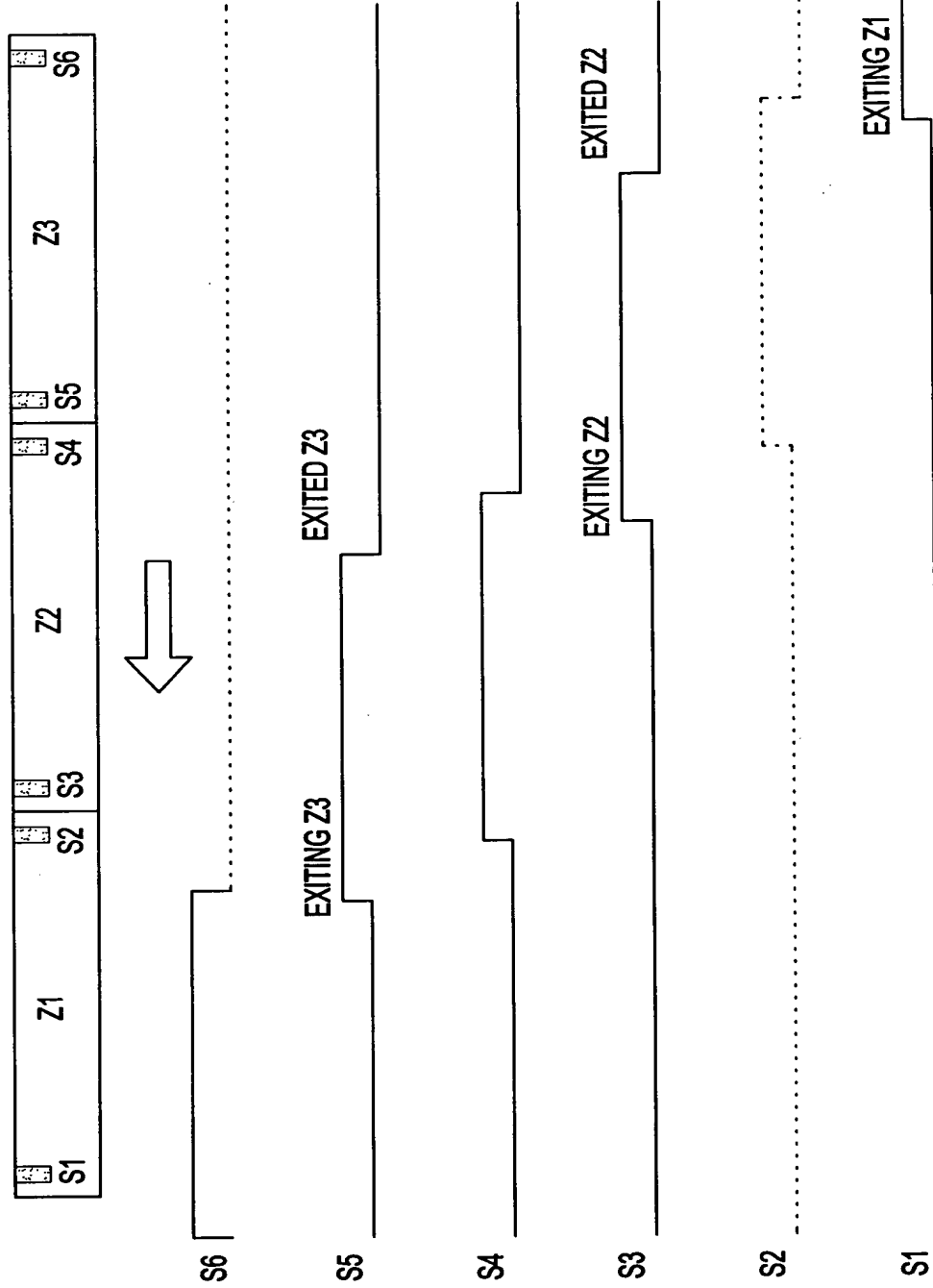


FIG. 26

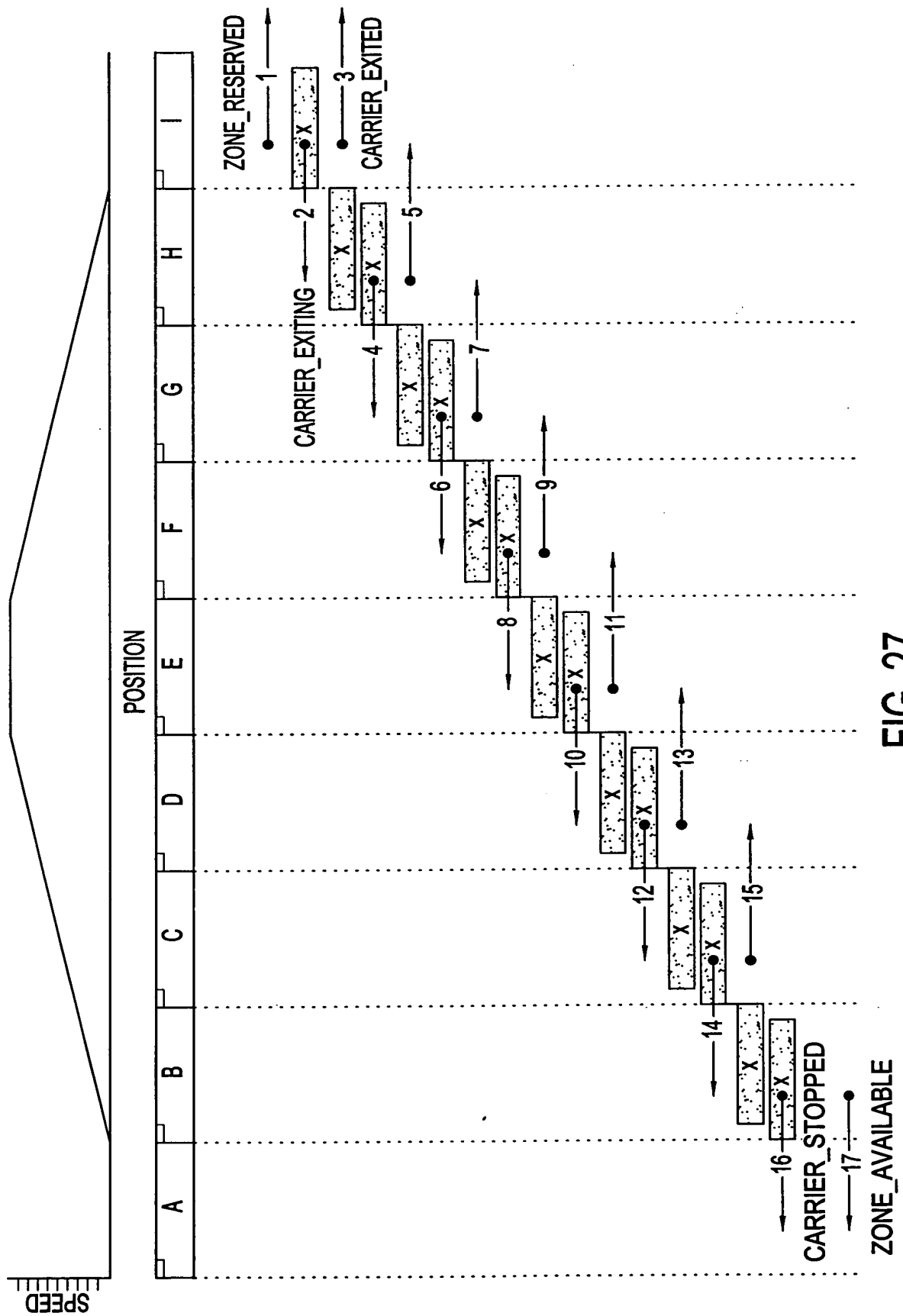


FIG. 27

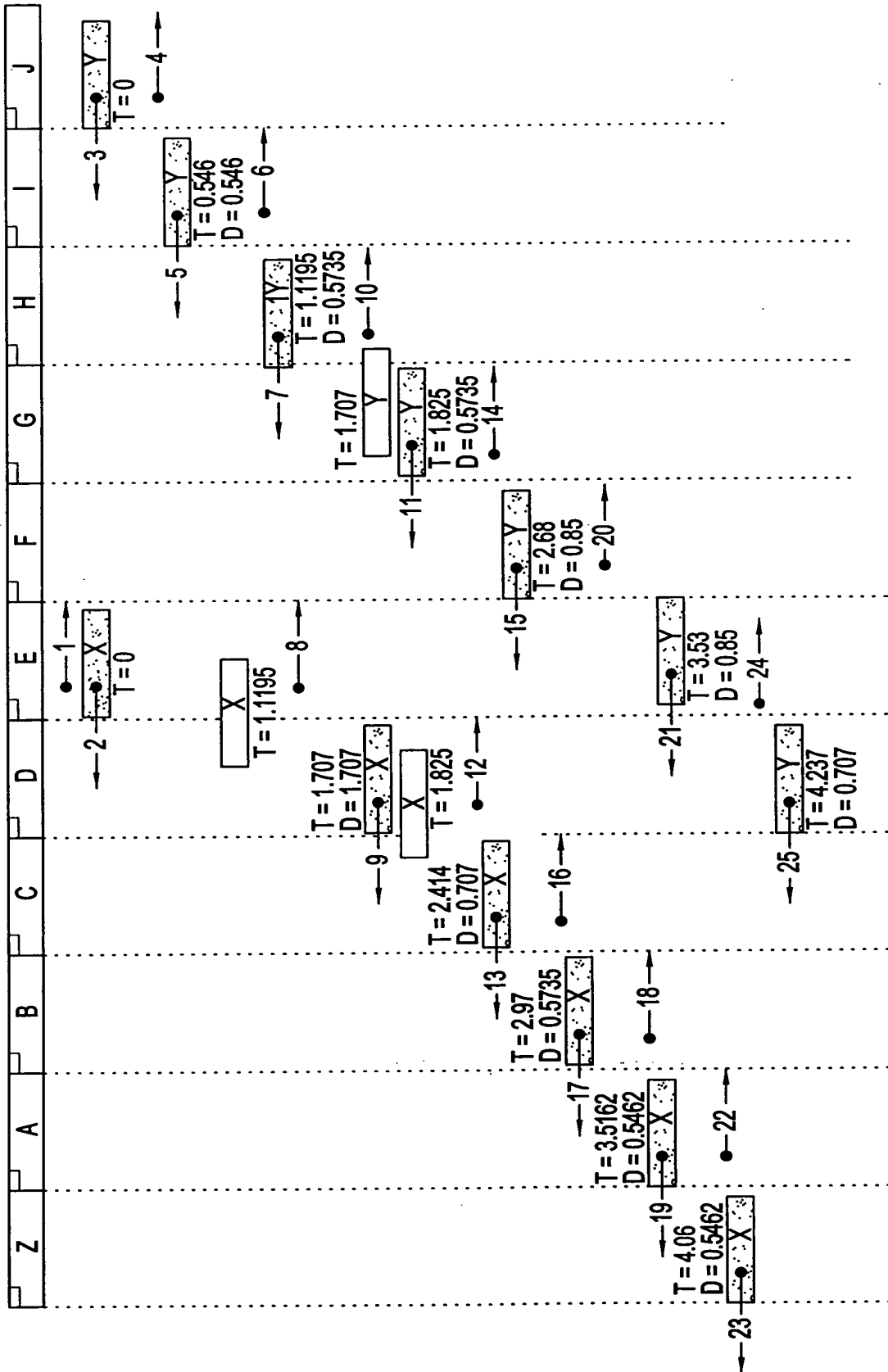
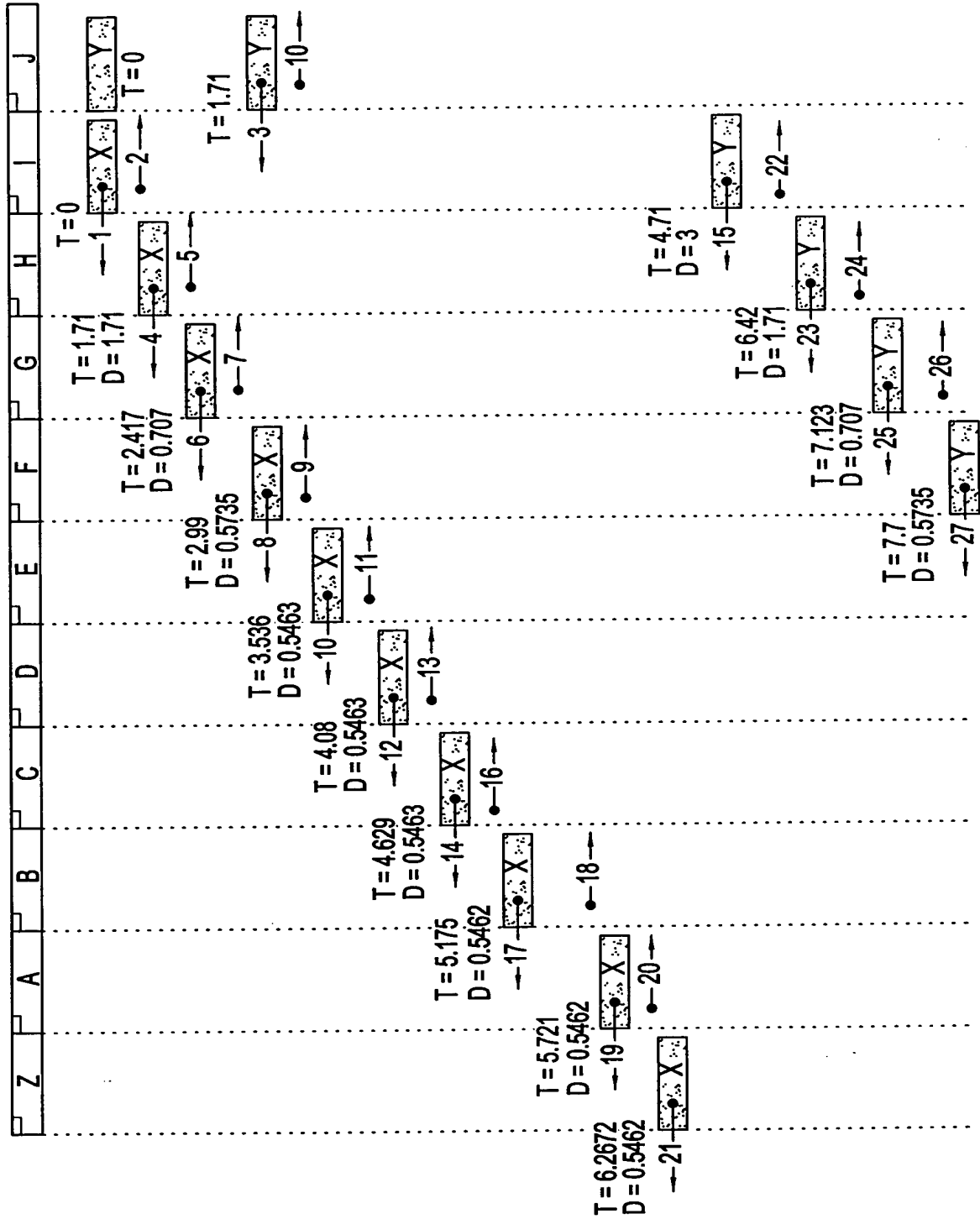


FIG. 28

FIG. 29



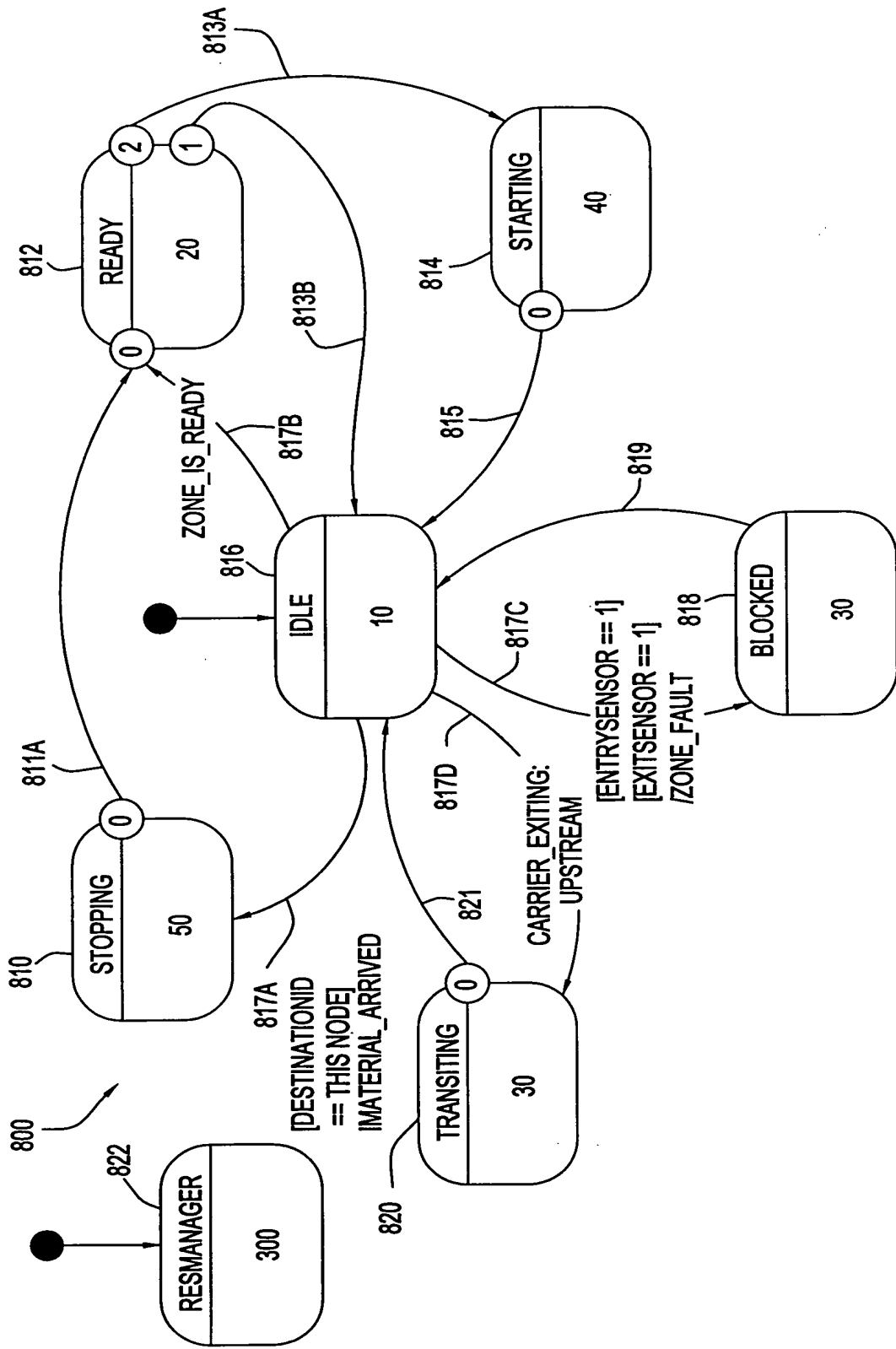


FIG. 30

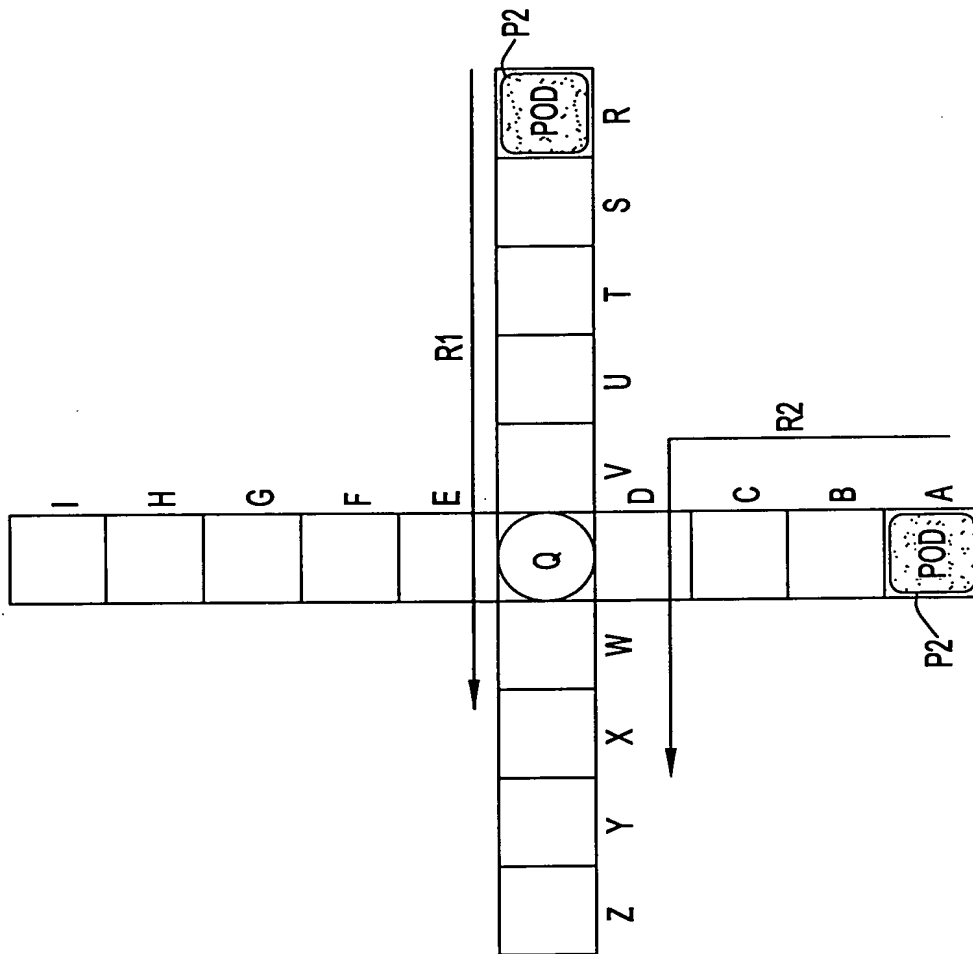
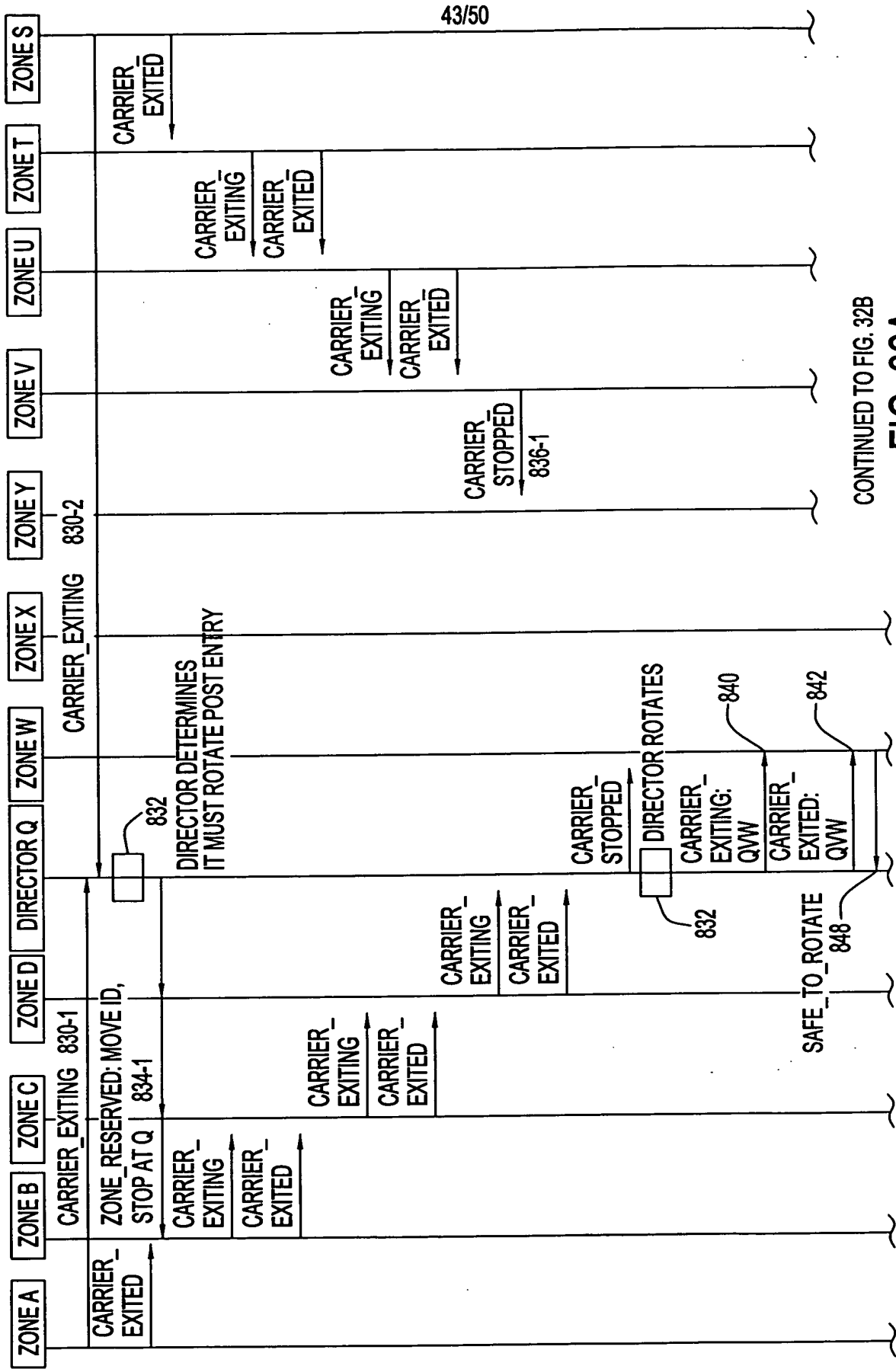


FIG. 31



CONTINUED TO FIG. 32B

FIG. 32A

CONTINUED FROM FIG. 32A

ZONE_RESERVED: SECOND MOVE ID, NO STOP

834-2

CARRIER_
EXITINGCARRIER_
EXITEDCARRIER_
EXITINGCARRIER_
EXITEDCARRIER_
EXITING:
QWWCARRIER_
EXITED:
QWWSAFE TO
ROTATECARRIER_
EXITING:CARRIER_
EXITED:DIRECTOR ROTATES BACK TO
ITS HOME POSITION ZONE-
AVAILABLE: QDE

844

846

CARRIER_
EXITINGCARRIER_
EXITEDCARRIER_
EXITINGCARRIER_
EXITED

FIG. 32B

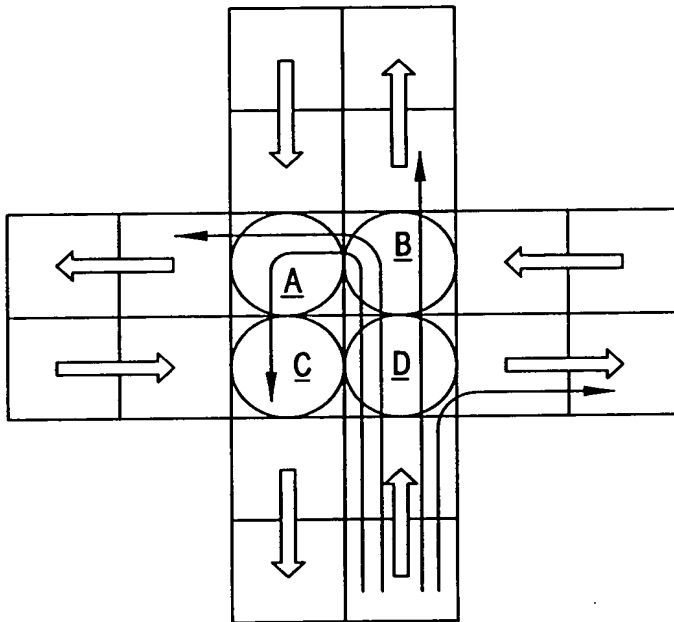


FIG. 33A

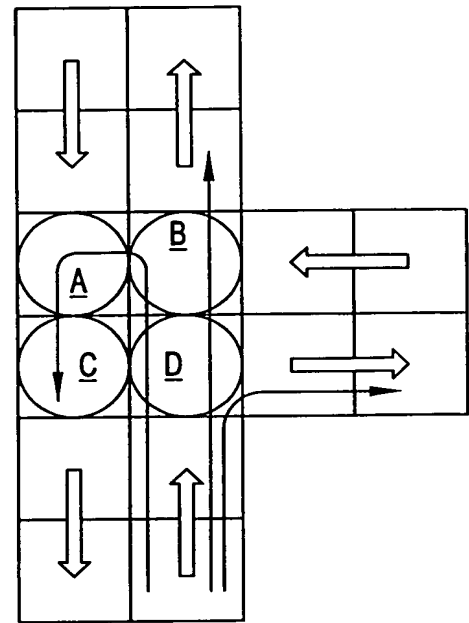


FIG. 33B

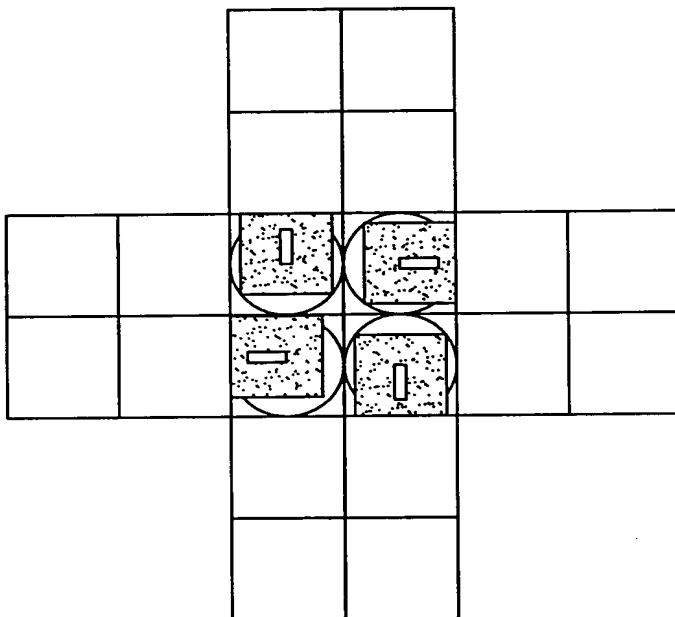


FIG. 33C

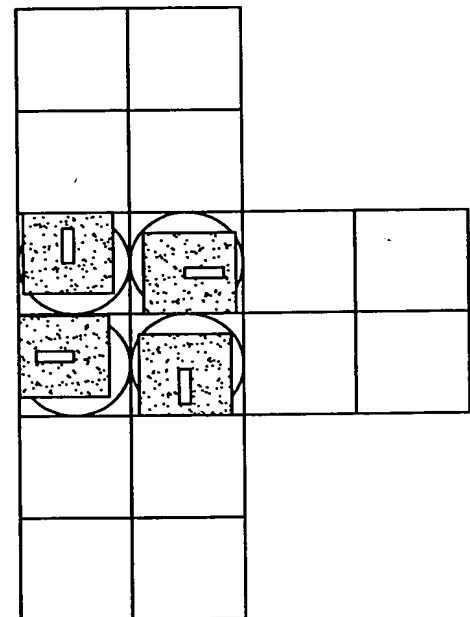


FIG. 33D

$\frac{d}{dt} \left(\frac{\partial L}{\partial \dot{x}} \right) = \frac{\partial L}{\partial x}$

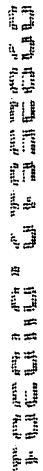


FIG. 34

ROUTE DISCOVERY EXAMPLE:
UPSTREAM ZONE CONNECTIVITY

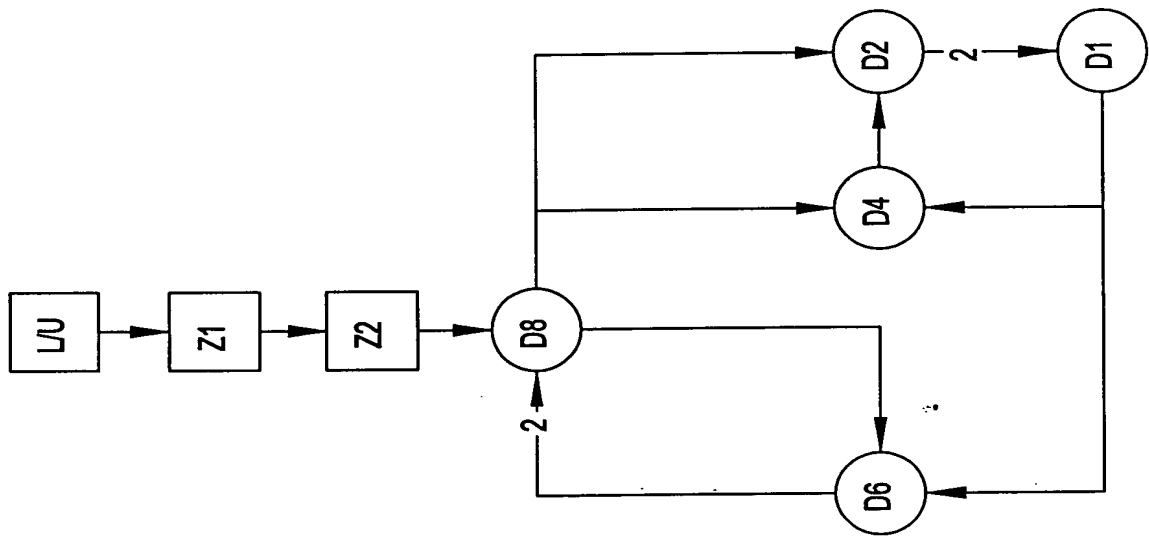


FIG. 35

ROUTE DISCOVERY EXAMPLE:
PHYSICAL ZONE LAYOUT

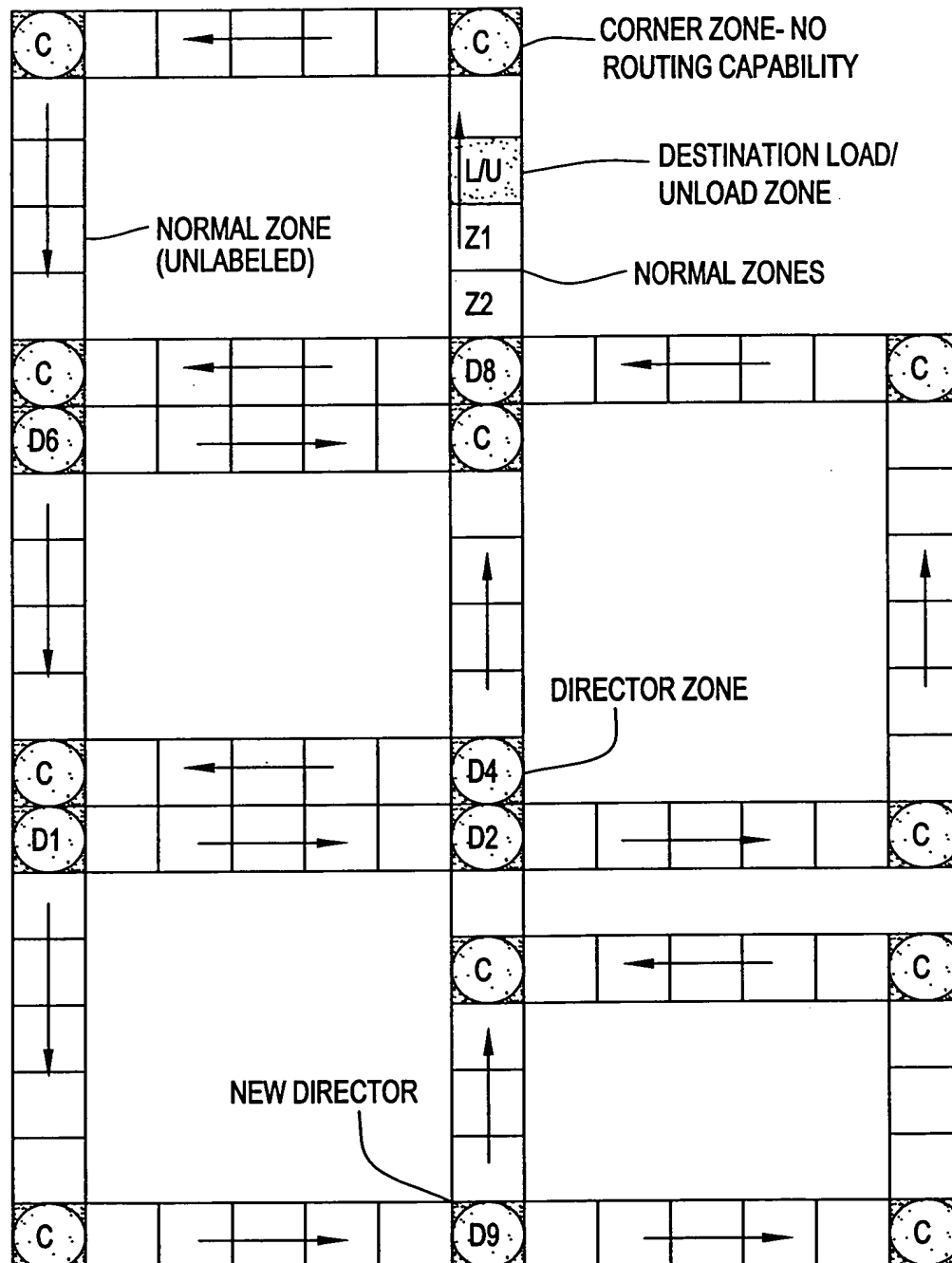


FIG. 36

FAILED NODE:
EXAMPLE LAYOUT

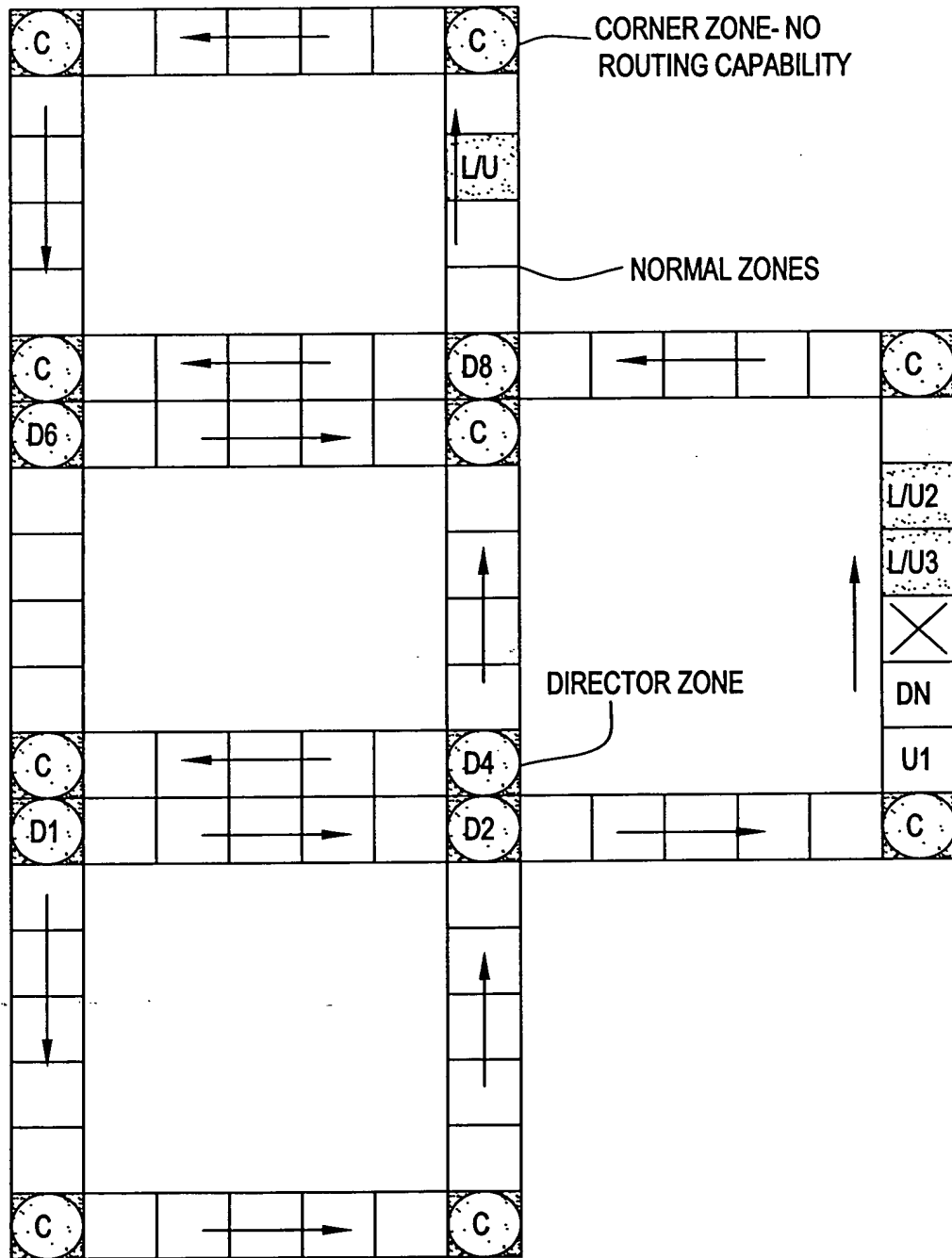


FIG. 37

FAILED DIRECTOR:
EXAMPLE LAYOUT:

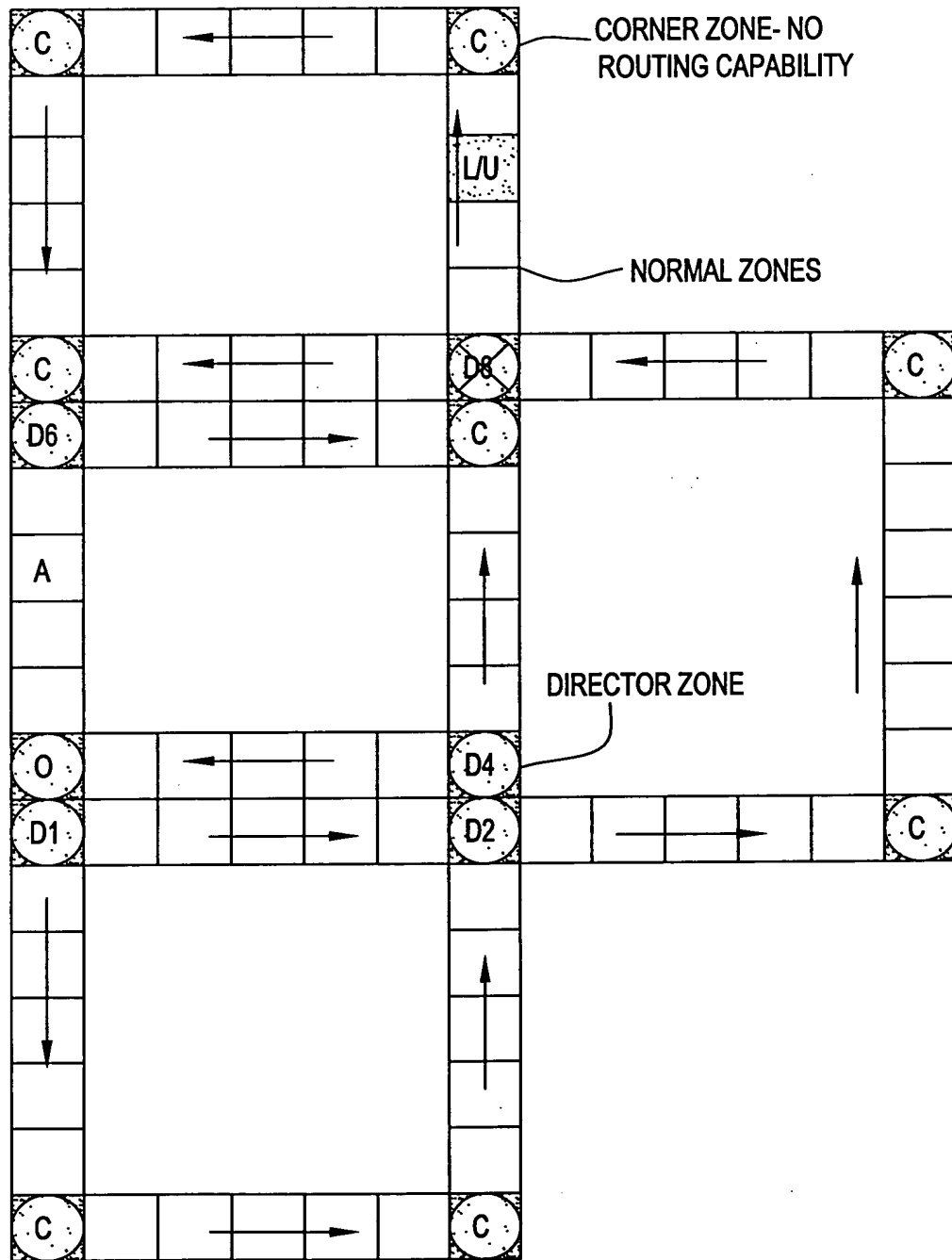


FIG. 38